Canada and International Grain Markets: Trends, Policies, and Prospects

Colin Carter
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Foreword

This study was undertaken as part of the Economic Council's project on the Future of the Prairie Grain Economy – a project referred to the Council by the Prime Minister in a letter dated March 31, 1987.

> I am encouraged to see the Council proposing a significant collaborative effort with federal and provincial governments and the private sector. I am pleased to support this particular study as a vehicle for public debate on a pressing problem which concerns us all, the future of the Prairie grain economy. I expect it to produce an invaluable exchange of information, while leaving the Council, as always, to its own independent views, conclusions and recommendations.

This particular study reviews the major changes that have taken place in world grain markets since 1965. It examines the international policy environment that will shape trade in wheat and coarse grains over coming years, and looks at how success or failure in the current GATT negotiations will affect Canada's position. The authors devote particular attention to Canada's agricultural exports to Japan.

The Council received financial support for this project from the governments of Saskatchewan and Alberta, Agriculture Canada, The Prairie Pools Incorporated, Cargill Limited, and the Royal Bank of Canada. Representatives of these organizations, as well as independent experts, gave generously of their time to attend meetings of the project's Technical Advisory Committee. The Council is glad to acknowledge this valuable support.

Other studies in this series deal with the international supply and demand of wheat, coarse grains, and canola; Canadian policy towards Prairie agriculture; the effects of the cost-price squeeze on Prairie farms; and the opportunities for diversifying agriculture in the Prairie provinces. The Council put forward its recommendations for improving public policy regarding Prairie agriculture in a Statement published in November 1988.

Dr. Andrew Schmitz of the University of California, Davis, and the University of Saskatchewan was director of research for this study and one of its authors. Dr. Colin Carter and Dr. Alex McCalla are members of the Agricultural and Resource Economics Department at the University of California, Davis.

Judith Maxwell
Chairman

1 The Setting

Grain production is an integral part of Canadian agriculture, with the largest percentage of grain output being produced in the Prairie region. The province of Saskatchewan is the largest grain producer, where wheat is the predominant grain crop. Alberta and Manitoba have a more diversified agricultural sector.

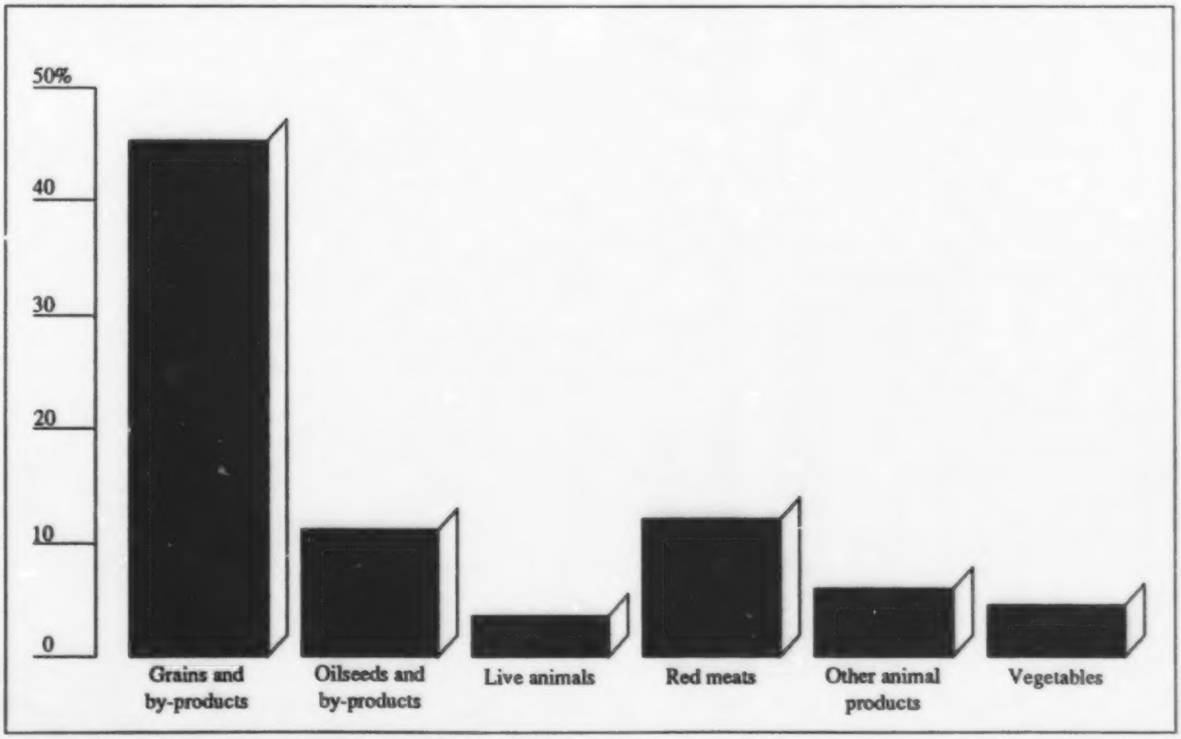
Because of Canada's small population relative to its food production base, well over 60 per cent of Canadian grain production finds its way into export markets. Grains are Canada's largest agricultural export, comprising between 40 and 50 per cent of Canada's total agricultural exports (Chart 1-1). Canada's leading export markets are: the United States, the Soviet Union, Japan, the European Community, and China (Chart 1-2). These data, however, are for all agricultural exports; therefore, for grain markets the ranking is different. For example, the U.S. market for Canadian grains is relatively small.

Because of the nature of Canadian agriculture and the distribution of Canada's population, the Prairie region is much more dependent on both interprovincial and international agricultural trade than is eastern Canada. Unlike in the West, a large percentage of the food produced in eastern Canada is consumed domestically. In fact, the grain economy in the West is much more dependent on export markets

Chart 1-1

Canada's Major Agricultural Exports, 1986

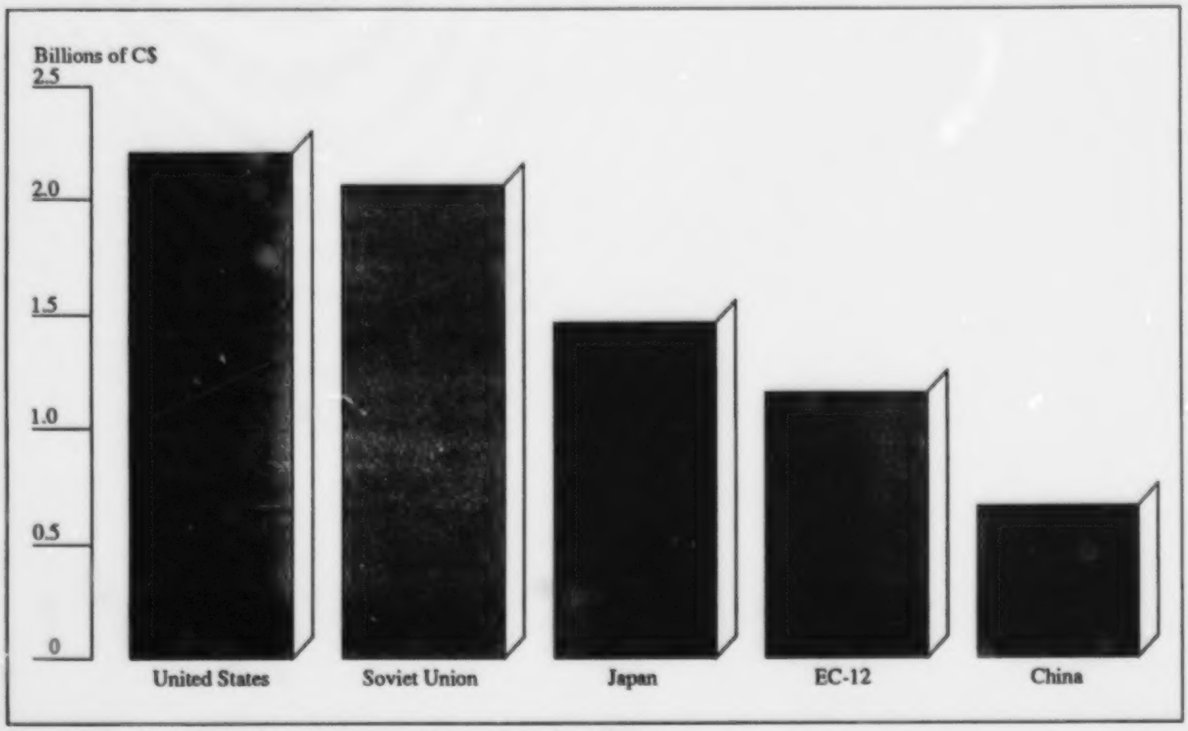
Proportion of total agricultural exports



SOURCE Agriculture Canada, *Canada's Trade in Agricultural Products*.

Chart 1-2

Canadian Agriculture's Leading Export Markets, 1984



SOURCE Agriculture Canada, *Market Commentary*, (Ottawa: September 1987).

(where exports are expressed as a percentage of production) than most other major grain exporters. As a result, the nature and structure of international grain markets shape the future level of prosperity for Prairie agriculture.

Canada's stake in the international grain trade is significant. Because export prices fell sharply in the late 1980s, with real wheat prices at levels below those which prevailed during the Great Depression, Canada has been supportive of increased trade liberalization in world agricultural markets. Through time, the degree to which agricultural trade has become distorted through the use of tariff and non-tariff barriers has increased. In addition, Canada has proposed a national agricultural strategy whereby agricultural export trade is to be given high priority. Also, it is a member of the Cairns free-trade group, and it is highly supportive of the objectives of the General Agreement on Tariffs and Trade (GATT).

Agricultural trade liberalization has never really been included in the GATT negotiations, but that is about to change in the eighth round of negotiations, which is now taking place. Previous GATT negotiations excluded agriculture because most trade barriers were put in place to support domestic farm programs, and domestic policies have not been subject to GATT rules. The 94 members of GATT have agreed to change that approach, and agriculture is now on the bargaining table. The focus of the agricultural discussions in the Uruguay Round of GATT will be on the policies of the developed countries, because they typically overprotect agriculture through trade barriers and subsidies.

In addition to the above, Canada and the United States signed a free-trade agreement in 1988. Even though the grain trade between the two countries is relatively insignificant, the Agreement is of importance in a broader context concerning the future of the Canadian grain economy. The United States is a major export competitor in international grain markets. Cooperation through a Canada-U.S. free-trade agreement could lend support for cooperation in GATT dealings. In addition, a bilateral agreement of this nature sets the stage for other bilateral arrangements and GATT. In this context, Japan is a major market for Canadian agricultural products, including wheat, pork, and canola, even though it is a highly protected market. The effects of freer trade between Japan and Canada, through a bilateral agreement or through GATT, could well be significant. Analysing the effects of a bilateral free-trade agreement between Canada and Japan, regardless of whether or not it could ever happen, illustrates the importance of liberalized trade for Prairie agriculture.

Purpose and Scope

This study provides an economic analysis of the international grain markets, with the major emphasis on wheat. Canada's role and future in these markets are highlighted. In addition, because Japan is a major buyer of Canadian agricultural products, results are presented for freer trade between these two countries, and the focus is on both grains and red meats.

This study is divided into seven chapters, the first of which provides the setting. Chapter 2 provides an overview, beginning in the 1960s, of trends in the world's grain markets and is focused largely on wheat and coarse grains. It discusses the larger grain exporters and importers and how the major market participants have changed through time. Emphasis is given to both the large increases in production in regions such as Europe and China and the changing nature of the demand for grains. The structure of import demand has changed in terms of both the buyers and the quality of grain purchased. Developed countries are no longer the major importers of wheat; growth in demand has occurred in the developing countries. This growth, however, has not been in high-quality wheat but, rather, in medium-quality varieties. Through time, Canada's major buyers have also changed, to the point where, in the 1980s, the largest importers are the centrally planned economies.

In Chapter 3 an assessment is made of how the policies of individual countries have affected the evolution of the grain trade. The major focus is on two key participants – the United States and the European Community. The United States, through its farm policy of target prices, loan rates, and export enhancement programs, has had a significant impact on countries such as Canada, Australia, and Argentina. Other countries respond to changes in U.S. farm policy; thus, to understand the full impact of one country's policy change, the policy response from other governments has to be considered. An analysis is made of the extent to which cooperation has occurred in grain-export marketing and the extent to which the United States sets the floor on world market prices during periods of excess supply. Several features are highlighted, including: 1) the growth in production in the United States, Canada, the European Community, and China; 2) the extent to which Canada's export price follows that set under U.S. farm policy; 3) the key determinants of U.S. farm policy; and 4) the response of competing exporters to changes in U.S. farm policy.

The focus of Chapter 4 is on the degree to which governments intervene in world markets through agricultural protectionism and export subsidies. D. Gale Johnson's book entitled *Agriculture in Disarray* analysed the problems of world agricultural trade in the early 1970s. Since then, however, there has been an increase in agricultural protectionism.[1] The expansion of trade barriers has important implications for Canadian agriculture, especially the Prairie region, since protectionism reduces the demand for the region's exports. Measures of protectionism are presented, by country, and even though there is disagreement over which of the many techniques to use, all of the measures suggest that Japan and the European Community have the highest degrees of protection. The effects of trade liberalization differ across countries and by groups within countries. Generally speaking, grain prices are set above world prices in the developed countries and below world prices in developing countries. Thus trade liberalization could benefit producers in several less developed countries but harm producers in the European Community and Japan, for example. On the other hand, consumers could benefit in the latter two regions but, in general, be harmed in many less developed regions and in the centrally planned economies.

Chapter 5 deals with the future prospects for Prairie grains, with and without trade liberalization. The effects of trade liberalization are quantified, and it is shown how they alter the outlook for grains. The results differ, depending on many aspects, such as whether or not trade liberalization will occur only in developed countries or in developing countries as well. When developing countries are included, the gains from trade are greater than if only developed countries liberalize trade.

The effects of trade liberalization on Canada and several other regions are discussed. Since there are gainers and losers from trade liberalization, some of the problems in negotiating trade liberalization through GATT are highlighted. Even though the results show significant overall gains from freer trade, the extent to which more liberalized trade is possible depends on the political power of the groups that may lose from freer trade. European farmers, for example, are not only highly protected; they are also politically powerful. They will not easily accept the losses they would incur as a result of the removal of tariff and non-tariff trade barriers.

Chapter 6 focuses on Canadian-Japanese agricultural trade and highlights the distortions that exist for major exportables from Canada to Japan, including wheat, coarse grains, canola, and red meats. The size of the distortions is significant. Also, there are several aspects of trade that are discussed in detail, including an hypothesis as to why, for example, Canada has less than 5 per cent of the Japanese beef import market.

In the final chapter, conclusions are drawn concerning the future direction of the Prairie grain economy. The discussion is limited to alternative strategies and choices in the international marketing arena. Other policy aspects that pertain to domestic agricultural policy within Canada, such as credit, are discussed in a separate report.[2]

Historical Perspective

Since the focus of this study is on the world's grain markets from the early 1960s on, a brief overview is needed of still earlier times. Governments have always been heavily involved in the Canadian grain industry. For example, in 1835, which predates Confederation and the opening of the West, the legislative council and assembly of Upper Canada passed an Act establishing standard weights for different kinds of grain. In 1899, a Royal Commission was established to study the shipment and transportation of grain. Shortly thereafter, in 1906, a second Royal Commission on the grain trade in Canada was appointed. In 1912 the *Canada Grain Act* was passed. Subsequently, the role of governments in the Prairie grain economy and trade increased. Table 1-1 shows the production of wheat on the Prairies and in Canada during the period 1911-54. Wheat output on the Prairies more than doubled between 1911 and 1928, when production reached 544.6 million bushels. Output then declined, and it was not until 1952 that production exceeded that of 1928 – at 678 million bushels.

The export market was the key to the development of the Prairie grain economy; by 1911 over half of the production was exported. At least three features of the export trade were then apparent: 1) Canada emphasized the production and exportation of high-quality, high-protein wheats; 2) the major markets for Canadian wheat were in Europe, primarily the United Kingdom and West Germany; and 3) Canada was a major wheat exporter, with a market share that, at times, exceeded 30 per cent of the total wheat exports of the world.

Data on wheat imports are given in Table 1-2 for the crop years 1922/23 to 1937/38. Britain, Ireland, France, Germany, Italy, and the rest of the European importing countries imported roughly 80 per cent of the world's total grain imports during those years. On average, Britain and Ireland were both the largest and most stable importers, accounting for 30 to 35 per cent of the world's wheat imports. During the depression years, their imports declined but not nearly as drastically as those of other importers.

The grain economy experienced turbulent times in the first half of this century, and details have been provided elsewhere, in the seminal work by V. C. Fowke, *The National Policy and the Wheat Economy*.[3] Fowke's research highlights the development of Prairie agriculture, the controversies surrounding the building of the railways, the formation of grain cooperatives, the evolution of the Canadian Wheat Board, the role played by private grain traders and the Winnipeg Grain Exchange, and the formation of Canadian agricultural policy. Many of the features present then still remain today. Grain prices fluctuated a great deal. For example, the boom of the late 1920s was followed by the Great Depression. Wheat prices fell from $1.03/bushel in 1929/30 to $0.34/bushel in 1932/33. The effects are clear from Chart 1-3, where it is shown that total cash receipts in the Prairie provinces fell from roughly $600 million in 1928 to below $200 million in 1931 – a threefold drop in three years. Throughout the 1930s, the total cash income remained below one-half of the level of the late 1920s.

In addition, there was a continuing search for export market opportunities, and there were attempts at stabilizing markets through international wheat agreements. For example, in 1922, Prime Minister R. B. Bennett was signatory to the International Wheat Agreement. It was an attempt to adjust supply to effective demand and thus raise and stabilize prices. Under the Agreement, the major wheat exporters agreed to reduce domestic wheat production by 15 per cent. Prior to the 1930s there was a significant expansion in production. Canada, the United States, Argentina, and Australia, combined, expanded acreage from 34 million hectares in 1909-13 to 50 million hectares in 1926-29.[4]

Grain stocks also fluctuated greatly from year to year, along with production and exports. As Chart 1-4 shows, stocks were insignificant until 1920/21; they then increased but varied from year to year. Also, there were large fluctuations in both production and exports. For example, exports in 1923/24 were roughly three times greater than in 1919/20.

This overview of the history of Canadian grain markets is intended to make several points. First, the world's grain markets have always been highly unstable; there have been

Table 1-1

Production of Wheat in the Prairie Provinces and Canada, 1911-54

	Prairie provinces			
	Wheat acreage	Yield per acre	Output	Canada's output
	(Millions)	(Bushels)	(Millions of bushels)	
1911	10.0	20.8	208.4	230.1
1921	22.2	12.6	280.1	300.9
1925	19.8	18.2	367.1	395.5
1926	21.8	17.5	380.8	407.1
1927	21.4	21.2	454.6	480.0
1928	23.2	23.5	544.6	566.7
1929	24.3	11.6	281.7	304.5
1930	24.8	16.0	397.3	420.7
1931	25.6	11.8	301.2	321.3
1932	26.4	16.0	423.0	443.1
1933	25.2	10.4	263.0	282.0
1934	23.3	11.3	263.8	275.8
1935	23.3	11.3	264.1	281.9
1936	24.8	8.1	202.0	219.2
1937	24.6	6.4	156.8	180.2
1938	25.0	13.5	336.0	360.0
1939	25.8	19.1	494.0	520.6
1940	27.7	18.5	513.8	540.2
1941	21.1	13.9	296.0	314.8
1942	20.7	25.6	529.0	556.7
1943	16.1	16.6	267.8	282.4
1944	22.4	17.5	391.7	414.9
1945	22.6	13.1	294.6	316.3
1946	23.7	16.6	393.0	411.6
1947	23.4	13.7	320.0	338.5
1948	22.8	15.6	356.0	381.4
1949	26.5	12.9	341.0	366.0
1950	25.8	17.0	439.0	466.5
1951	24.4	21.6	530.0	553.6
1952	25.2	26.9	678.0	701.9
1953	24.6	23.7	584.0	614.0
1954	23.4	12.0	282.0	308.9

SOURCE Sanford Evans Statistical Service, *Grain Trade Yearbook* (Winnipeg); and Dominion Bureau of Statistics, *Wheat Review* (Ottawa: Queen's Printer, August 1956).

Table 1-2

Net World Exports of Wheat and Flour, and Net Imports by Selected Country Groups, Crop Years 1922/23 to 1937/38

		Net imports			
	Net world exports	Britain and Ireland	France, Germany, and Italy	Rest of European importing countries	Eastern European importing countries
			(Millions of bushels)		
Crop years (August to July):					
1922/23	718	210	209	160	101
1923/24	835	240	169	184	163
1924/25	779	228	215	175	119
1925/26	702	208	150	170	146
1926/27	852	236	263	175	127
1927/28	827	232	220	198	139
1928/29	946	219	233	215	182
1929/30	613	224	96	188	140
1930/31	838	245	174	198	166
1931/32	802	261	135	215	184
1932/33	631	234	48	163	157
1933/34	555	238	26	133	126
1934/35	541	217	22	134	139
1935/36	523	220	13	118	114
1936/37	607	212	102	130	98
1937/38	546	208	59	138	98

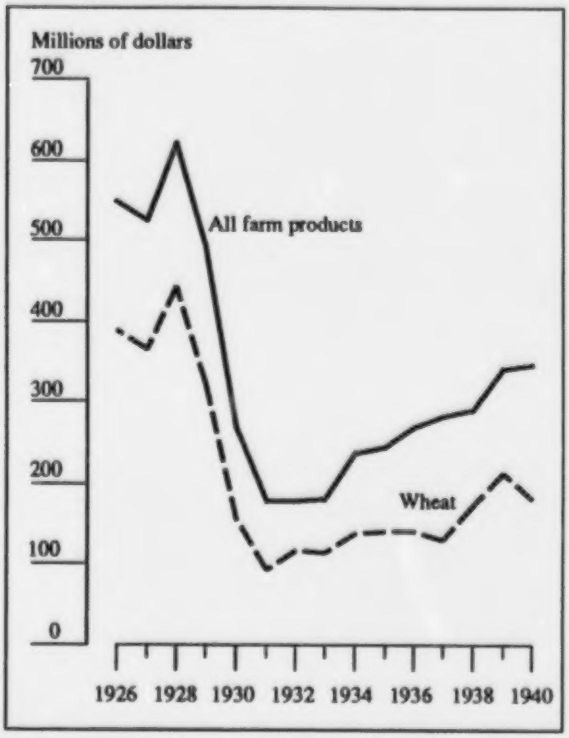
SOURCE C. F. Wilson, *An Appraisal of the World Wheat Situation*, Proceedings of the Conference on Markets for Western Farm Products, Winnipeg, 1938, p. 50.

many boom-and-bust periods. Second, Canada has pursued an export-based strategy. Third, governments have always been heavily involved in plotting the future course for the Prairie grain economy. Last, because of the volatility of grain markets and their changing nature, governments have found it extremely difficult to come up with solutions to the problems facing grain producers on the Prairies. Despite numerous policy initiatives, Prairie agriculture in the late 1980s is experiencing a severe recession. This is largely a result of the collapse of the world's grain markets and of the fact that prices dropped to the point where real prices in 1987 reached their lowest level in history. The following chapters outline both the forces that led to the collapse of the world's grain economy – forces that in many cases were beyond the influence of Canadian agricultural policy – and a course that the world's grain trade could take in the future.

Chart 1-3

Cash Income from the Sale of Wheat and of All Farm Products, Prairie Provinces, 1926-40

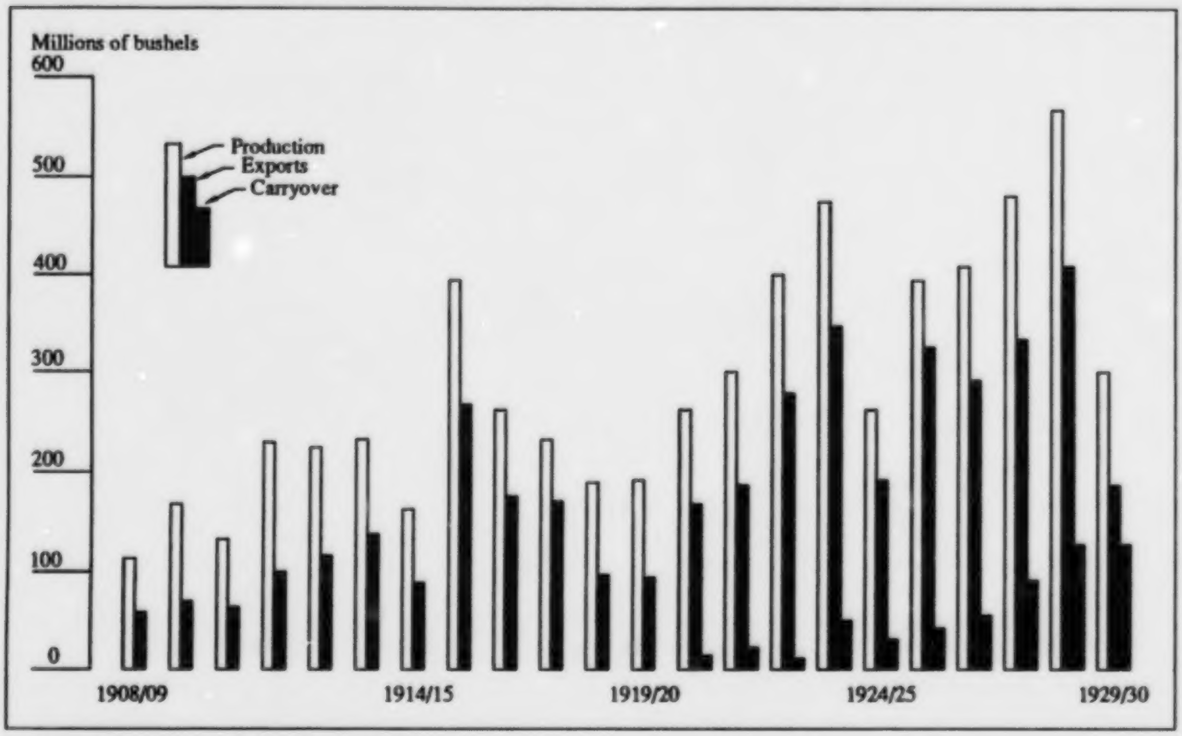
Calendar years



SOURCE Dominion Bureau of Statistics, *Handbook of Agricultural Statistics, Part II: Farm Income, 1926-57* (Ottawa: Queen's Printer), pp. 50-55.

Chart 1-4

Canadian Production, Exports,[1] and Carryover[2] of Wheat, Crop Years 1908/09 to 1929/30



1 Exports include wheat and wheat flour equivalent.

2 Year-end carryover estimates commenced with crop year 1920/21.

SOURCE Based on data from Statistics Canada.

2 An Overview of Global Market Trends

The Prairie region of Canada is highly dependent upon grain production. Because of the country's relatively small population, a large percentage of Canada's grain production is exported. The Prairie region's future in grains is thus highly dependent on the growth in export markets. The purpose of this chapter is to explore the nature of the world's grain trade, in which Canada competes.

This chapter begins by exploring broad trends in world agricultural markets. Special emphasis is given to trade in grains. In particular, the declining importance of developed countries (DCs), as well as the rising importance of less developed countries (LDCs) and centrally planned economies (CPEs), as major importers of grains is identified. Canadian and U.S. export performance is reviewed against this broad context.

The review of broad trends clearly shows a continuing concentration of exporters (United States, European Community, Canada, Australia, and Argentina) and a diversification of importers. For example, the European Community, the largest importer of grains in the 1950s and 1960s, is now the second largest exporter. The analysis examines major exporters as to their market performance. This is followed by looking at major importers and importing regions (Japan, the Soviet Union, Egypt, Africa, Asia, and Latin America). The dramatic switch of Western Europe from a major importer to a large exporter receives special attention. The phenomenal growth in yields and production in China and India is discussed. These two countries are so large that a marginal shift from the position of importer to exporter, or vice versa, could have a significant impact on world markets. These are two large unknowns in world markets of the future. The chapter concludes with a discussion of the major participants and their potential impact on world markets.

World Agriculture and Grain-Market Trade Flows

World agricultural – and more specifically world grain – markets have not only expanded rapidly since the Second World War, in terms of volume and value, but significant changes in the structure of markets have occurred. For purposes of this discussion, structure includes: 1) patterns of trade flows, including direction of trade and market shares; 2) volume of trade; 3) composition of trade, including the nature of commodities and their quality; and 4) value of trade, and prices and price instability. For purposes of this analysis, particular attention needs to be paid to Canada's changing role. That is accomplished through some comparisons with U.S. performance. The purpose of this section is to provide a historical context for the discussion that follows on Canada's potential role in world markets.

Patterns of Trade in Grains and Cereals

A review of broad trends in agricultural trade shows that the developed countries of North America, Western Europe, Japan, Australia, New Zealand, and South Africa have become more important as exporters and relatively less important as importers. The centrally planned economies of Eastern Europe and the Soviet Union, as well as the less developed countries, have become larger net importers.[1] The above trends are even more pronounced for the grain trade. Table 2-1 shows the shifting origin-destination pattern for the grain trade over the postwar period, with an interwar comparison. A negative sign indicates an importer, a positive sign, an exporter. Prior to the Second World War there were three net importing countries/regions for grain: Western Europe (mainly the United Kingdom), China, and Japan. Of these, Western Europe was the dominant importer. All other countries/regions were exporters, including all developing-country regions. The Soviet Union was also a significant exporter. This pattern of many exporters and few importers changed dramatically after the Second World War. By 1985-86 all developing-country and centrally planned regions were significant importers; of the developed countries, only Japan remains an importer, albeit an important one.

Several trends shown in Table 2-1 are worthy of careful note. First, the United States has changed from an insignificant trader to the dominant exporter. Second, Canadian and Australian exports have increased by four times and

Table 2-1

World Net Exports and Net Imports (–) of Grain,[1] Selected Periods, 1934-86

	1934-38	1948-52	1960-62	1969-71	1975-76	1979-81	1982-83	1985-86
				(Millions of tons)				
Developed countries								
United States	0.5	14.0	32.8	39.8	84.1	106.4	99.0	66.1
Canada	4.8	6.0	9.7	14.8	16.0	18.6	25.8	20.6
South Africa	0.3	–	2.1	2.5	3.4	6.2	0.5	1.1
Oceania	2.8	3.7	6.6	10.6	11.0	14.2	12.0	21.9
Western Europe	–23.8	–22.5	–25.6	–21.4	–18.8	–11.1	–4.5	13.2
Japan	–1.9	–2.3	–5.3	–14.4	–18.9	–23.2	–23.7	–27.0
Centrally planned economies (CPEs)								
Soviet Union and Eastern Europe	4.7	2.7	0.5	–3.6	–35.7	–39.3	–44.6	–35.4
China	–1.0	–0.4	–3.6	–3.1	–1.7	–11.4	–14.7	–12.0
Developing countries								
Latin America	9.0	2.1	0.8	3.2	3.7	–5.3	0.2	–2.1
North Africa and the Middle East	1.0	–0.1	–4.6	–9.2	–15.7	–23.3	–27.8	–24.8[2]
Asia (excluding Japan and China)	2.4	–3.3	–5.6	–11.0	–16.0	–13.4	–14.1	–19.5

[1] Grain includes wheat, milled rice, corn, rye, barley, oats, sorghum, and millet.

[2] Includes Africa only.

SOURCE Economic Report of the President (Washington: U.S. Government Printing Office, 1984), p. 123, for years 1934 to 1983; and United Nations, *Food Outlook Statistical Supplement* (Rome: FAO, 1986).

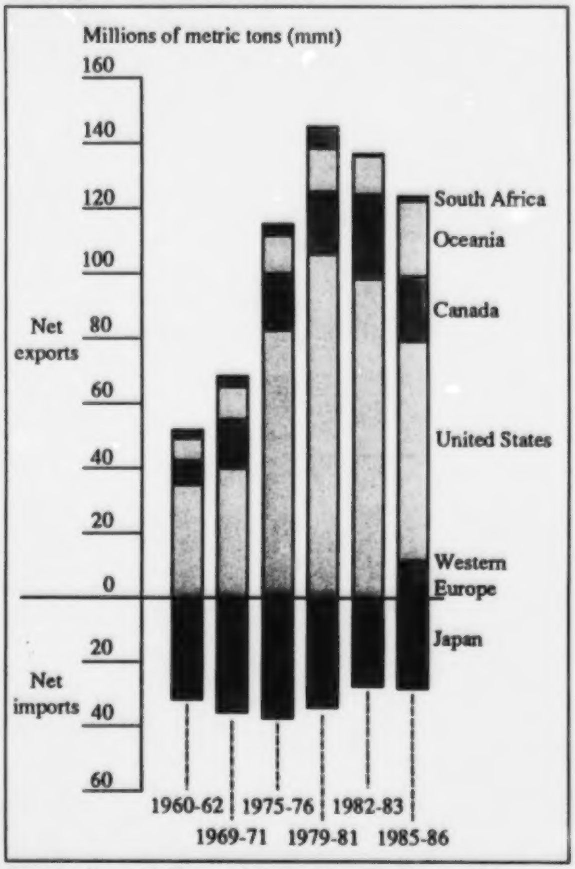
seven times, respectively. Third, Western Europe has switched from being a net importer of over 25 million tons in 1960-62 to a net exporter of 13 million tons in 1985-86. These trends are shown graphically in Chart 2-1. Fourth, the Soviet Union switched from a significant exporter up until 1970 to a major, but highly variable, importer in the 1970s and 1980s. Fifth, China grew as an importer in the 1970s and 1980s but dropped off in importance following economic reforms in the late 1970s and 1980s. Sixth, all developing-country regions, particularly Asia (excluding Japan and China), North Africa and the Middle East have become major importers. The data for the CPEs and LDCs are presented in graphic form in Chart 2-2. Thus the pattern of trade in the 1980s has been one of few exporters and many importers.

More detail on shifting market shares is contained in Table 2-2, which shows the distribution of exports, by origin, among importing regions. Using the same regional categories, it is clear that the structural shifts that were discussed with regard to total trade are even more pronounced in cereals. Note, for example, that DC importers declined in importance as a destination for developed-country exports (56 to 37 per cent) between the period 1969-73 and 1985 and also declined in terms of world imports (from 50 to 31 per cent). On the other hand, both LDCs and CPEs have increased in importance as destinations for developed-country trade and for total world imports. In 1985, LDCs accounted for 43 per cent of the world's cereal imports; CPEs, 25 per cent.

The trends for the United States and Canada shown in Chart 2-3 tend to mirror the decline in importance of developed-country importers and the rising importance of CPE and LDC destinations. The United States, however, has a much higher dependence on LDCs, while Canada now sends nearly 50 per cent of its exports to the CPEs. Specifically, the proportion of U.S. cereal exports going to DC markets declined from 52 to 35 per cent, while the share going to LDCs increased slightly (40 to 43 per cent). The United States more than doubled its dependence on CPE markets (8 to 21 per cent). The higher U.S. dependence on LDC markets clearly reflects the large PL 480 shipments in the 1960s and early 1970s. The importance of DC markets for Canada declined from 48 to 27 per cent in the period 1969-83; Canada compensated for that mainly by increasing shipments to the CPEs (33 to 49 per cent).

Chart 2-1

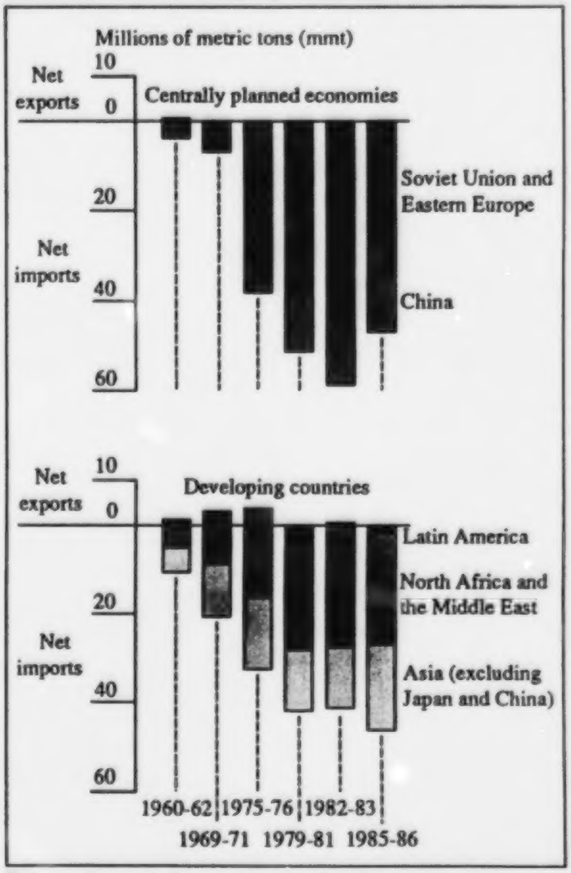
Net Exports and Imports of Grain, Developed Countries, 1960-86



SOURCE Economic Report of the President (Washington: U.S. Government Printing Office, 1984), p. 123, for years 1934 to 1983; and United Nations, *Food Outlook Statistical Supplement* (Rome: FAO, 1986).

Chart 2-2

Net Exports and Imports of Grain, Centrally Planned Economies and Developing Countries, 1960-86



SOURCE Economic Report of the President (Washington: U.S. Government Printing Office, 1984), p. 123, for years 1934 to 1983; and United Nations, *Food Outlook Statistical Supplement* (Rome: FAO, 1986).

The relative changes in U.S. and Canadian market shares for wheat are presented in more detail in Tables 2-3 and 2-4 for the period 1960/61 to 1984/85. The changes are significant. In 1960/61 the United States sold 30 per cent of its exports to DCs; in the same year, Canada sold 70 per cent of its wheat exports to DCs. In 1984/85 the proportion of U.S. wheat going to DCs had dropped by about one-half to 13 per cent. That same year, the share of Canadian exports going to DCs was about the same as for the United States – 14 per cent – a drop of nearly 500 per cent since 1960/61. The United States already had a well-established market in the LDCs in 1960/61, with those countries taking 64 per cent of the exports (mainly under PL 480). The U.S. percentage in 1984/85 was exactly the same, though in the late 1960s the LDC share of U.S. exports had been 78 per cent. It should also be noted that in 1984/85 a very high proportion of U.S. sales to LDCs were commercial. Canada's shipments to the LDCs accounted for 15 per cent of exports in 1960/61; that doubled to 30 per cent in 1984/85. Canada largely replaced its lost markets in DCs with sales to centrally planned economies; its share of the latter increased from 15 per cent in 1960/61 to 56 per cent in 1984/85. Thus

Table 2-2

Cereals:[1] Export Shares Among Import Destination Markets, Selected Years, 1969-85[1]

	Destination		
	Developed countries (DCs)	Centrally planned economies (CPEs)	Developing countries (LDCs)
		(Per cent)	
Origin of exports:			
Developed countries			
1969-73	56	12	31
1974-78	50	16	33
1979-83	39	24	36
1984	36	25	38
1985	37	23	39
Developing countries			
1969-73	45	6	50
1974-78	33	14	53
1979-83	12	32	56
1984	12	23	65
1985	13	24	63
Centrally planned economies			
1969-73	13	60	27
1974-78	11	51	37
1979-83	8	53	39
1984	12	59	29
1985	23	47	30
World			
1969-73	50	16	33
1974-78	46	17	35
1979-83	35	26	39
1984	32	26	42
1985	31	25	43

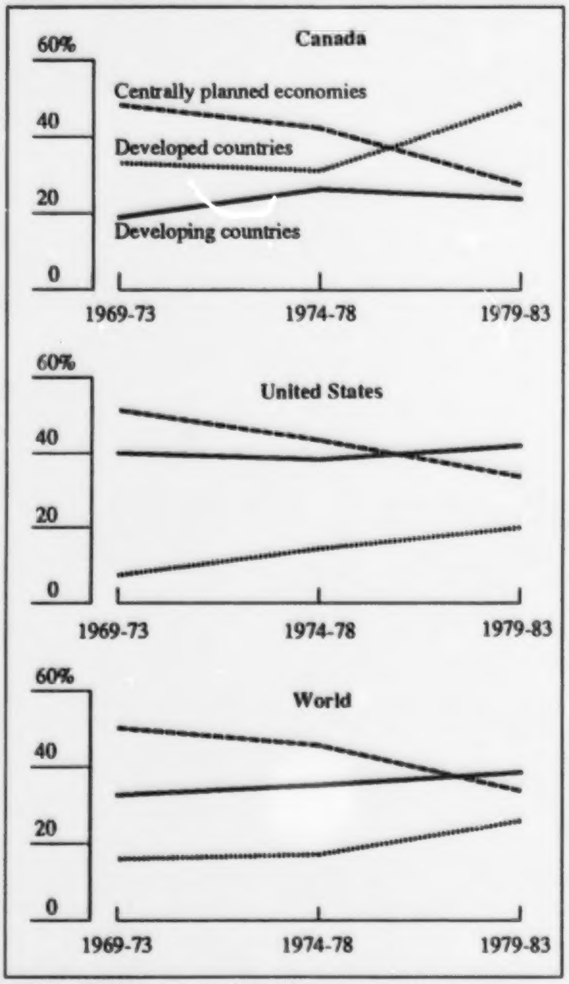
[1] Cereals include wheat, rice, corn, barley, and oats.

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

the pattern of adjustment to the declining market for wheat exports in the DCs has been much more dramatic for Canada than for the United States.[2]

Chart 2-3

Market Shares of Canadian, U.S., and Other Cereal Exporters, 1969-83



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Patterns of Production, Consumption, and Trade in Wheat and Coarse Grains

This section delves, in more detail, into global patterns of production, consumption, and trade in wheat and coarse grains. Each is treated separately; then a discussion is presented in terms of shifting patterns of utilization and in terms of both feed use and quality.

Table 2-3

Market Share of Wheat and Wheat Flour Exports to Major Regions, United States, Crop Years 1960/61 to 1984/85

	Destination		
	Developed countries	Centrally planned economies	Developing countries
	(Per cent)		
Crop year:			
1960/61	30	6	64
1961/62	30	2	68
1962/63	21	3	76
1963/64	25	14	61
1964/65	23	1	76
1965/66	30	–	70
1966/67	28	1	71
1967/68	22	–	78
1968/69	28	–	72
1969/70	28	–	72
1970/71	37	2	61
1971/72	26	–	74
1972/73	22	34	44
1973/74	21	21	58
1974/75	20	9	71
1975/76	24	15	61
1976/77	20	16	64
1977/78	20	15	65
1978/79	19	19	62
1979/80	21	22	57
1980/81	19	29	52
1981/82	16	31	53
1982/83	14	19	67
1983/84	17	20	63
1984/85	13	23	64

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Table 2-4

Market Share of Wheat and Wheat Flour Exports to Major Regions, Canada, Crop Years 1960/61 to 1984/85

	Destination		
	Developed countries	Centrally planned economies	Developing countries
	(Per cent)		
Crop year:			
1960/61	70	15	15
1961/62	60	27	13
1962/63	63	19	18
1963/64	41	51	8
1964/65	46	39	15
1965/66	33	54	13
1966/67	38	41	21
1967/68	50	35	15
1968/69	49	30	21
1969/70	43	35	22
1970/71	41	24	35
1971/72	31	43	26
1972/73	23	55	22
1973/74	37	27	36
1974/75	35	25	40
1975/76	32	43	25
1976/77	32	34	34
1977/78	30	36	34
1978/79	27	42	31
1979/80	26	40	34
1980/81	22	51	27
1981/82	20	52	28
1982/83	17	58	25
1983/84	17	46	37
1984/85	14	56	30

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Wheat

Between 1960 and 1985, wheat production in the world more than doubled – from 238 million metric tons (mmt) to 503 mmt (Table 2-5). Trade in wheat increased about two and one-half times over the same period, from 44 mmt to 98 mmt, after having peaked at 116 mmt in 1984. The area harvested was essentially constant, while yields on a global basis nearly doubled from 1.17 metric tons per hectare (mt/ha) to 2.19 mt/ha. Chart 2-4 shows the trend in production for Canada, the EC-12, and the United States.

Table 2-6 provides more detail on yield growth, which is one of the major variables driving the changing trade patterns. Even though average world yields have nearly doubled, the performance by countries and regions is quite different. Comparing the three-year average for 1960-62 with the average for 1983-85, the following statistics emerge. The average yield for the European Community (all 12 members) more than doubled, from 2.03 mt/ha to 4.59 mt/ha; however, in one country within the European Community – the United Kingdom – yields slightly less than doubled, from 3.82 mt/ha to 6.8 mt/ha. The U.S. yields

Table 2-5

World Statistics on Wheat: Area Harvested, Yield, Production, Feed Use, and Trade, 1960-85

	Area harvested	Yield	Production	Feed use	Trade
	(Thousands of hectares)	(mt/ha)		(mmt)	
1960	202,192	1.17	238.4	26.3	43.9
1961	203,450	1.10	224.8	29.3	46.9
1962	206,873	1.21	251.8	25.6	46.2
1963	206,302	1.13	233.9	20.1	58.3
1964	215,937	1.25	270.4	29.1	54.9
1965	215,518	1.22	263.3	43.9	61.1
1966	213,640	1.43	306.7	37.4	58.4
1967	219,201	1.35	297.6	43.7	53.5
1968	223,899	1.47	330.8	55.4	50.3
1969	217,834	1.42	310.0	64.9	55.8
1970	206,992	1.51	313.7	72.4	56.5
1971	212,860	1.64	351.0	74.6	56.1
1972	211,036	1.62	343.4	79.1	71.6
1973	217,142	1.71	373.2	63.8	73.0
1974	220,054	1.63	360.2	66.7	68.4
1975	225,370	1.58	356.6	59.1	73.3
1976	233,190	1.80	421.4	61.2	70.8
1977	227,102	1.69	384.1	79.1	75.5
1978	228,911	1.95	446.8	81.8	84.0
1979	228,296	1.85	424.5	87.2	93.3
1980	236,982	1.86	442.9	84.2	96.9
1981	238,675	1.87	448.4	80.1	107.8
1982	237,543	2.01	479.1	88.6	107.0
1983	229,111	2.14	490.9	90.9	110.4
1984	231,180	2.22	514.6	95.3	115.9
1985	229,203	2.19	503.2	93.1	97.8

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

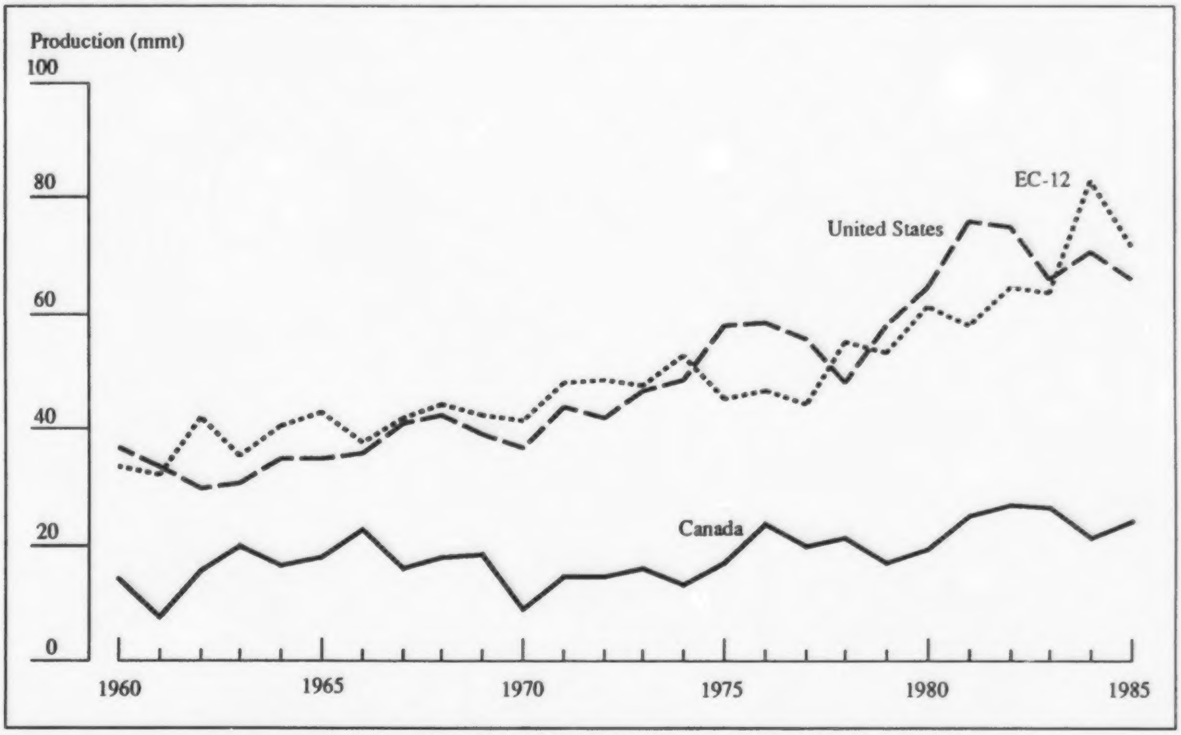
grew by 55 per cent, while Canadian yields increased by one-quarter, from 1.41 to 1.76 mt/ha (see Chart 2-5). Australian yields were very low and erratic, and they showed no discernible trend, having averaged about 1.25 mt/ha over the period. Besides in the European Community, phenomenal changes in yields occurred in India and China – both large wheat producers. India's yields more than doubled, from 0.83 mt/ha to 1.82 mt/ha, and were higher than Canadian yields in most recent years, while Chinese yields more than tripled over the same period (Chart 2-6).

Coarse Grains

Comparable data for coarse grains are presented in Table 2-7. Over the period 1960-85, production of coarse grains nearly doubled. But trade in coarse grains increased almost three and one-half times, having risen from between 6 and 8 per cent of production in the 1960s to between 12 and 14 per cent of production in the late 1970s and early 1980s. The increase in production, as with wheat, came almost exclusively from yield increases. Yields increased 75 per cent, while the area planted increased by only 5 per cent on a global basis. Details for major producers are shown in Chart 2-7. Comparable data for barley – Canada's major coarse-grain export – are presented in Table 2-8. The patterns in barley production mirror those of all coarse grains. Production more than doubled; however, more of the increase in barley was accounted for by an increase in the area planted – about 35 per cent. Yields increased by 50 per cent. Trade in barley increased 325 per cent, compared with nearly 350 per cent in coarse grains. Therefore barley's

Chart 2-4

Wheat Production, Selected Countries, 1960-85



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

share of trade declined slightly over the period, from 23 per cent of exports to 20 per cent in the 1980s.

Utilization of Wheat and Coarse Grains

In the period 1960-85, production of wheat on a global basis increased more rapidly than that of coarse grains; however, trade in coarse grains increased more rapidly than trade in wheat. Of added importance, the use of wheat for feed increased more rapidly than production or trade in either wheat or coarse grains. On a global basis, the use of wheat for feed increased from around 25 mmt to over 90 mmt – an increase of 360 per cent, partly the result of the change in prices between wheat and corn (Table 2-9 and Chart 2-8 provide greater detail). The major increases in feed use have occurred in two places – the Soviet Union and the European Community. Feed use in the Soviet Union increased from less than 10 mmt in the early 1960s to a peak of over 50 mmt in 1979. The current level of 35 mmt represents nearly 40 per cent of Soviet wheat consumption. In the European Community, feed consumption of wheat tripled over the period. These two regions account for nearly two-thirds of global wheat consumption as feed. The other major users of wheat as feed grain in recent years have been Eastern Europe and the United States. Eastern European consumption has been between 12 and 15 mmt. The three largest users – the Soviet Union, the European Community, and Eastern Europe – account for over 80 per cent of total feed use.

What are the implications of these developments? First, lower grades of wheat are quite substitutable for feed grains, particularly with favourable relative prices. Second, if the growth in wheat trade for feed could be netted out of total wheat trade, one would expect that the growth rate in wheat trade for food consumption would be considerably lower.

Table 2-6

Wheat Yields of the World, by Selected Countries, 1960-85

	World	EC-12[1]	United Kingdom	United States	Canada	Australia	India	China
				(mt/ha)				
1960	1.17	1.88	3.57	1.75	1.42	1.36	0.77	0.78
1961	1.10	1.91	3.53	1.60	0.75	1.12	0.85	0.55
1962	1.21	2.30	4.35	1.67	1.41	1.25	0.88	0.69
1963	1.13	2.07	3.90	1.69	1.76	1.33	0.79	0.77
1964	1.25	2.26	4.24	1.73	1.36	1.38	0.72	0.82
1965	1.22	2.38	4.06	1.73	1.54	0.99	0.91	1.02
1966	1.43	2.22	3.83	1.78	1.87	1.50	0.82	1.05
1967	1.35	2.64	4.18	1.73	1.32	0.83	0.88	1.12
1968	1.47	2.60	3.54	1.90	1.48	1.36	1.10	1.11
1969	1.42	2.56	4.03	2.05	1.80	1.11	1.16	1.08
1970	1.51	2.53	4.19	2.08	1.78	1.21	1.20	1.14
1971	1.64	2.95	4.38	2.28	1.83	1.20	1.30	1.27
1972	1.62	3.01	4.24	2.19	1.67	0.86	1.37	1.36
1973	1.71	3.11	4.36	2.12	1.68	1.33	1.27	1.33
1974	1.63	3.34	4.97	1.83	1.48	1.36	1.17	1.51
1975	1.58	3.10	4.34	2.05	1.80	1.40	1.33	1.63
1976	1.80	3.01	3.85	2.03	2.09	1.31	1.41	1.77
1977	1.69	3.18	4.90	2.06	1.96	0.94	1.38	1.46
1978	1.95	3.67	5.26	2.11	1.99	1.76	1.47	1.84
1979	1.85	3.59	5.23	2.29	1.63	1.45	1.56	2.13
1980	1.86	3.94	5.87	2.25	1.72	0.96	1.43	1.88
1981	1.87	3.71	5.84	2.32	1.99	1.37	1.62	2.10
1982	2.01	4.03	6.20	2.38	2.12	0.77	1.69	2.44
1983	2.14	3.96	6.37	2.65	1.93	1.70	1.81	2.80
1984	2.22	5.12	7.71	2.60	1.61	1.52	1.84	2.96
1985	2.19	4.68	6.31	2.51	1.74	1.37	1.81	2.93

1 Belgium, Britain, Denmark, Greece, Ireland, Italy, France, Luxembourg, Netherlands, Portugal, Spain, and West Germany.

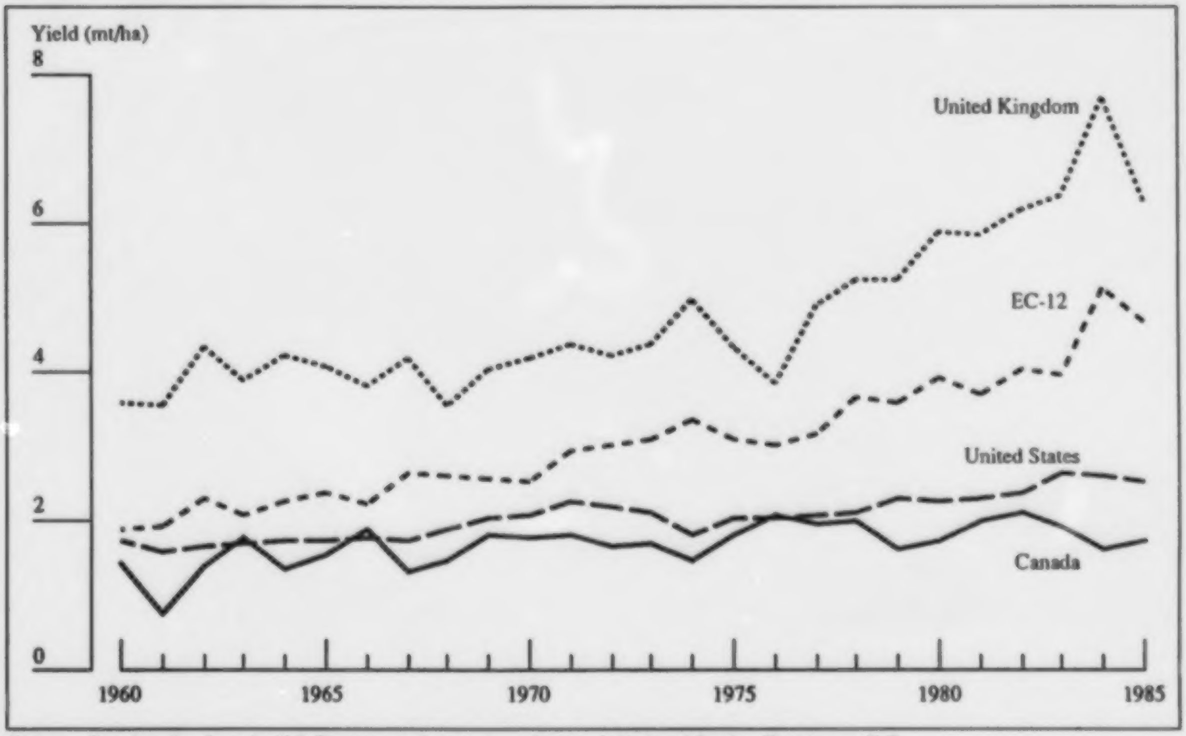
SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Third, both the growth in the use of wheat for feed and in coarse-grain trade reflect the expected change in patterns of consumption with income growth. The higher responsiveness of meat consumption to increased incomes, compared with that of food grains, should, and does, lead to an increase in the derived demand for feed grains. The even more rapid growth in demand for high-protein products – e.g., soybeans and soymeal – supports this hypothesis.

A related development has been the shifting patterns of preference for medium- and lower-quality wheats. Carter et al. (1986)[3] indicate that the market for medium-quality wheats is, by far, the largest and most rapidly growing. The market for high-quality wheat is, at most, growing very slowly. Storey (1986)[4] reports work by Henning (1985),[5] which evaluates the shifting patterns of preference for traditional-quality factors. The data clearly suggest that the growth rate of trade in high-quality wheat (Class 1, which contains most of the higher western Canadian wheat grades) has been much slower than for Classes 2, 3, and 4, which contain the bulk of most other wheat exporters' sales. Henning's work showed that the average annual growth rate for the period 1958-81 was 1.9 per cent per year for Class 1, compared with 2.9 per cent for Class 2, 7.3 per cent for Class 3, and 4.4 per cent for Class 4 (Storey, p. 569). Part of this shifting quality pattern reflects the increased use of wheat for feed discussed above. Henning's disaggregation by region suggests, however, that this shifting pattern is more pronounced in the importing CPEs and LDCs than in the declining developed-country market.

Chart 2-5

Wheat Yields in Canada, Compared with Those in the United Kingdom, the European Community, and the United States, 1960-85



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

A recent paper by Veeman[6] finds that there is still a premium for high protein in the wheat markets of the world, but her analysis suggests that it may not be sufficient to offset the loss from lower yields. The implications of these findings and the shifting preferences for wheat in the CPE and LDC markets suggest that Canada must carefully evaluate its place in these markets as opposed to the traditional high-quality markets; nevertheless, Canada should not totally abandon the production of high-protein wheat.

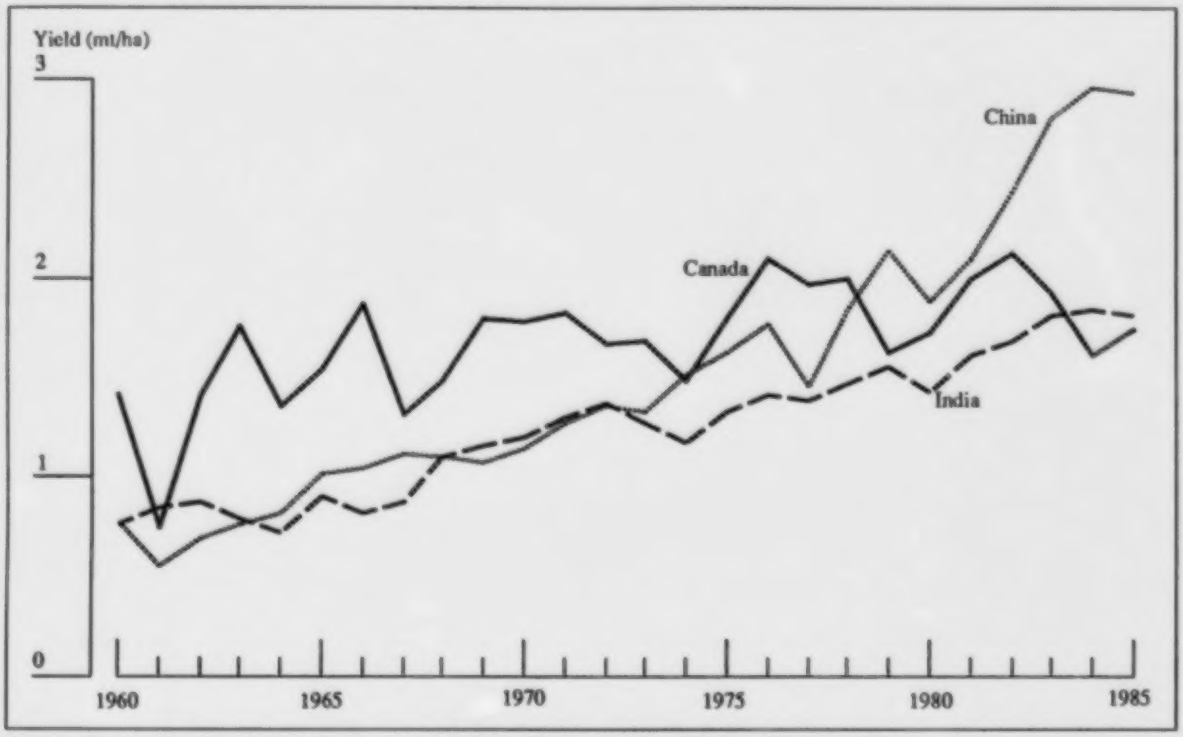
Price Trends and Price Stability

Nominal prices of grain in international markets were very stable for most of the 1950s and 1960s. Prices exploded in 1972/73, tripling between late 1972 and the middle of 1973. Prices declined sharply between 1975 and 1977, then increased in 1980 to a level, in nominal terms, approaching that of 1973. Prices in the 1980s have fallen precipitously (Chart 2-9). The period of the 1970s was also a period of global inflation, however; thus real prices are more revealing in terms of long-term trends. Chart 2-10 shows the real Canadian wheat prices that prevailed at the farm level from 1916 to 1986; clearly, though, even real prices are unstable. Also, if there is a discernible trend, it is downwards, which confirms the widely held proposition that real grain prices have declined in the twentieth century.

Declining real prices generally reflect supply factors, where technology-induced yield increases have shifted global wheat supplies more rapidly than population and income growth have shifted demand. Declining real prices, in and of themselves, have limited policy significance in market economies if they mainly reflect productivity improvement. There is the strong likelihood, however, that domestic policies in developed countries have contributed to declining prices. There can be no question that the rapid expansion of output in the European Community from 1967

Chart 2-6

Wheat Yields in Canada, Compared with Those in India and China, 1960-85



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

to the present was policy-induced. Similarly, the nature of U.S. policy has induced intensification of production on constrained acreage. Policy has also contributed to the instability in world markets. For example, the Soviet Union's in-and-out buying behaviour in grain markets has clearly had a destabilizing effect (McCalla and Josling).[7] This policy-induced instability, combined with more-traditional weather factors, has led to increased price instability in world grain markets in the 1970s and 1980s (Blandford, 1983; and Wilde et al., 1986).[8] These studies show that price variability in the 1970s and early 1980s increased, compared with that of the 1960s and 1970s, but the yearly variation in the volume of trade decreased. Thus it appears that policy measures that insulated domestic markets and prevented domestic adjustment to changing world conditions may be major contributors. In fact, Blandford finds that the United States is the only country which has contributed significantly to world stability by adjusting domestic production and consumption in a stabilizing fashion.

Price instability encourages nations to protect themselves against wide swings in prices in two ways. First, they attempt to insulate domestic producers from price changes. In developed countries this insulation is generally used to stabilize producer prices at levels above world prices, thus encouraging production and dampening consumption. These policies, in addition to being destabilizing, also put downward pressure on world prices. On the other hand, many developing and centrally planned economies tend to stabilize consumer prices, which, in turn, tends to encourage consumption and to slow production increases.[9] Again, these policies are destabilizing if nations use the international market as a vent for shortages and surpluses that result from domestic-production instability. Generally, however, they put upward pressure on world prices. The net impact of national policies on a global basis cannot be determined a priori. It is therefore an empirical question that will be addressed in a later chapter.

Table 2-7

World Statistics on Coarse Grains: Area Harvested, Yield, Production, Feed Use, and Trade, 1960-85

	Area harvested	Yield	Production	Feed use	Trade
	(Thousands of hectares)	(mt/ha)		(mmt)	
1960	324,244	1.38	447.7	254.6	25.6
1961	322,229	1.34	434.1	253.4	34.7
1962	320,752	1.43	459.4	257.7	32.6
1963	324,696	1.44	467.6	257.7	36.3
1964	321,632	1.47	472.9	264.9	37.7
1965	320,004	1.51	484.6	283.4	47.4
1966	320,951	1.62	520.4	300.6	43.7
1967	326,399	1.68	550.7	307.4	44.2
1968	325,843	1.69	552.7	318.3	40.7
1969	330,382	1.74	575.6	336.6	48.3
1970	331,303	1.73	575.1	341.1	54.3
1971	332,478	1.89	629.0	368.5	58.2
1972	325,713	1.86	607.8	379.7	68.9
1973	344,033	1.95	671.3	406.1	81.6
1974	341,883	1.84	631.2	368.1	69.9
1975	349,294	1.84	646.1	378.2	88.2
1976	344,702	2.04	704.7	404.1	89.3
1977	346,359	2.02	701.6	412.8	95.7
1978	343,721	2.19	755.1	450.4	99.8
1979	343,129	2.16	743.8	453.0	108.2
1980	342,370	2.14	732.8	434.2	118.8
1981	350,087	2.19	769.8	445.5	108.4
1982	339,083	2.29	779.1	461.2	98.0
1983	334,193	2.05	685.3	478.2	102.4
1984	338,617	2.38	808.1	504.4	112.0
1985	342,994	2.45	842.6	507.9	105.7

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

The second response to instability is the heightening of domestic food-security concerns, which leads to increasing producer prices to encourage domestic production and to lessen dependence on world markets. This approach of targeting domestic self-sufficiency has been pursued for both rice and wheat by India, China, and Pakistan, to name three countries. It has been the policy with respect to rice in almost all of Asia, resulting in very unstable international rice prices. Thus international market instability may be a contributor to slower growth in world trade.

Major Participants and Influential Players in the World's Grain Trade

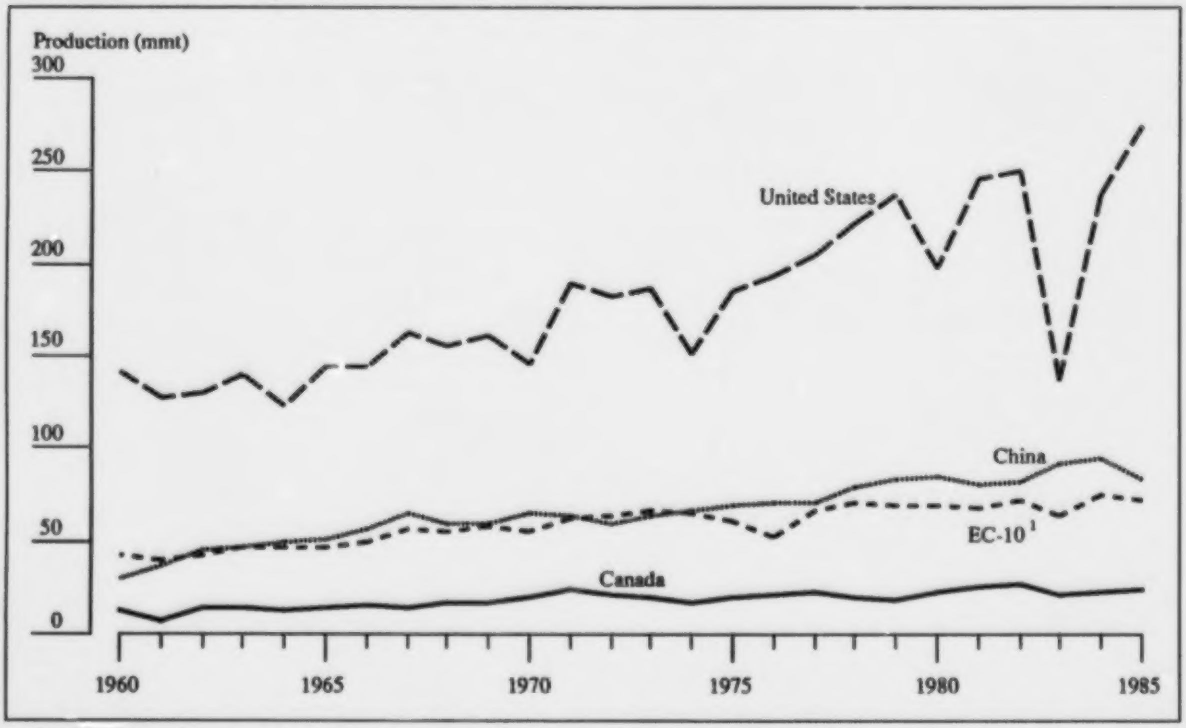
World trade in wheat – Canada's dominant crop – is, on the export side, dominated by few sellers. The import side of the market is shifting more to CPEs and LDCs, where state trading is the dominant feature. Therefore, what happens in the major participating countries or regions, both in terms of traditional economic variables – acreage, yield, utilization, and trade – and in terms of domestic policy, are the critical building blocks to a fuller understanding of future prospects.

Major Exporters

The world's wheat market has been, and is likely to continue to be, dominated by relatively few exporters (Table 2-10) – namely, the United States, the European Community, Argentina, Australia, and Canada. Since the early 1970s, these five countries/regions have accounted

Chart 2-7

Coarse-Grain Production, Selected Countries, 1960-85



1 Belgium, Britian, Denmark, Greece, Ireland, Italy, France, Luxembourg, Netherlands and West Germany.
SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

for over 75 per cent of the world's wheat exports. The two smallest exporters – Australia and Argentina – are also the most variable.

Argentina's exports have varied between 3.6 and 9.9 mmt in the 1980s. Argentina holds virtually no stocks; its exports depend on both production performance and policy changes. Production is variable because of both the weather and the shifting profitability between wheat, corn, soybeans, and beef. This relative profitability is heavily influenced by government policy, particularly as it relates to internal price policy and export taxes. Even though Argentina has considerable potential to expand its wheat exports (Mielke),[10] it is unlikely that its relative importance as an exporter will change materially. It will continue to be a highly variable exporter that sells its entire crop regardless of price.

Australia's exports are also highly variable but have shown an upward trend in recent years. Exports in the 1980s have varied between 7.3 and 15.5 mmt. Australia's exports are very sensitive to weather and wool prices. As wool prices increase, wheat acreage plantings decrease. Historically, Australia has not held extensive stocks; nor has it heavily subsidized producers. It also seems clear that Australia will not hold interyear stocks, having learned during the 1980 embargo that they have little influence on world prices (USDA, 1986).[11] Thus the variability of Australian exports is likely to increase in the near future.

Canada's export share in the wheat market ranges between 15 and 25 per cent. In general, its share falls in periods of rapid expansion (as in the 1970s) and rises in periods of slow or contracting growth. Canada's volume of exports is generally more stable than is that of any of the

Table 2-8

World Statistics on Barley: Area Harvested, Yield, Production, Feed Use, and Trade, 1960-85

	Area harvested	Yield	Production	Feed use	Trade
	(Thousands of hectares)	(mt/ha)		(mmt)	
1960	58,205	1.39	80.9	46.6	6.3
1961	57,670	1.29	74.5	44.1	7.2
1962	59,629	1.49	89.1	50.5	5.2
1963	65,682	1.40	92.0	53.8	7.7
1964	64,698	1.53	99.0	55.6	7.3
1965	62,762	1.50	94.7	60.8	8.7
1966	62,777	1.67	105.5	66.3	6.9
1967	63,453	1.71	108.8	66.8	7.0
1968	66,098	1.80	119.4	71.9	7.2
1969	68,833	1.78	122.7	79.0	9.2
1970	67,820	1.84	125.0	85.2	11.4
1971	69,741	1.94	135.8	88.3	14.5
1972	75,333	1.81	136.8	89.7	12.2
1973	78,262	1.95	153.0	102.1	12.5
1974	79,241	1.95	155.2	102.8	11.3
1975	82,515	1.70	140.8	94.6	13.3
1976	84,050	2.07	174.5	114.7	13.9
1977	85,523	1.91	163.5	110.7	15.3
1978	83,292	2.19	183.1	120.2	15.3
1979	86,112	1.86	160.4	115.2	15.6
1980	80,845	2.02	164.0	108.4	17.4
1981	83,708	1.87	157.0	104.7	20.3
1982	79,029	2.08	164.7	110.9	17.7
1983	80,091	2.10	168.9	123.1	20.5
1984	78,493	2.19	172.5	115.7	23.4
1985	78,664	2.24	176.9	125.3	23.5

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

other traditional exporters. It has varied between 17.5 and 21.8 mmt in the 1980s. That is generally the case because of Canada's willingness to hold stocks (mainly on farms) and to provide assistance to farmers in low-price periods. It also reflects a more stable demand pattern for high-quality wheat.

Exports from the *United States* exhibited an upward trend until the 1980s, as well as substantial variability. They have varied from 48.2 to 24.5 mmt in the 1980s, as both their volume and market share plunged. The market share fell from 45 per cent in 1981 to 25 per cent in 1985 but recovered somewhat in 1987. In the 1970s the United States was able to take advantage of the rapid expansion of demand both by reducing some of its large stocks and by expanding production through bringing back into production land that had been held out of production by farm programs. Production in the United States increased from a low of 36 mmt in 1970 to reach a peak of 76 mmt in 1981, most of which was accounted for by increases in harvested acreage; the latter rose from about 18 million hectares in 1970 to over 32 million hectares in 1981. There were also significant increases in yields during that period. By 1986, acreage had decreased to 23 million hectares; production, to 57 mmt.

The U.S. farm policy has very significant implications for world markets. The combination of target prices and loan rates with ineffective supply control acts as an implicit export subsidy. Furthermore, the U.S. loan rate over the longer term acts as a floor price for the United States and generally for world prices. The 1981 Farm Bill fixed loan rates and escalated target prices. That, in conjunction with

Table 2-9

World Use of Wheat for Feed, Selected Countries, 1960-85

	World	Proportion of total consumption	Soviet Union	Proportion of total consumption	United States	Proportion of total consumption	EC-12[1]	Proportion of total consumption	Canada	Proportion of total consumption
	(mmt)	(Per cent)	(mmt)	(Per cent)	(mmt)	(Per cent)	(mmt)	(Per cent)	(mmt)	(Per cent)
1960	26.3	11	9.7	16	0.8	5	7.9	18	1.7	40
1961	29.3	12	13.0	20	1.2	7	7.4	17	1.2	31
1962	25.6	10	8.2	13	1.0	6	8.3	19	1.2	32
1963	20.1	8	2.7	5	0.8	5	7.7	18	1.5	35
1964	29.1	11	9.2	14	1.5	9	8.6	20	1.3	33
1965	43.9	16	20.4	27	4.0	21	9.0	20	1.4	33
1966	37.4	13	16.2	22	2.7	14	8.7	20	1.6	36
1967	43.7	15	20.2	27	1.0	6	9.4	21	1.5	35
1968	55.4	18	27.6	32	4.2	21	10.5	23	1.7	38
1969	64.9	20	33.5	36	5.1	25	12.7	27	2.3	50
1970	72.4	22	38.6	38	5.2	25	13.2	27	2.2	45
1971	74.6	22	36.4	39	7.1	30	12.9	27	2.2	46
1972	79.1	22	41.3	42	5.5	25	15.2	30	2.1	44
1973	63.8	17	30.5	32	3.5	17	11.9	26	1.9	41
1974	66.7	18	33.7	36	1.1	6	12.8	27	1.7	37
1975	59.1	17	29.9	34	1.0	5	9.6	21	1.8	39
1976	61.2	16	28.2	30	2.0	10	10.0	22	1.8	36
1977	79.1	20	42.9	40	5.3	23	10.8	23	1.5	29
1978	81.8	19	43.0	40	4.3	19	12.1	25	2.4	45
1979	87.2	20	53.0	46	2.3	11	12.8	26	2.5	45
1980	84.2	19	48.0	42	1.6	8	13.3	27	2.1	42
1981	80.1	18	42.0	41	3.6	16	14.0	28	2.1	40
1982	88.6	19	45.4	43	5.3	21	15.9	32	1.9	37
1983	90.9	19	36.0	37	10.2	34	21.1	38	2.9	46
1984	95.3	19	36.0	38	11.2	36	23.2	39	2.5	46
1985	93.1	19	35.0	36	8.8	30	23.8	40	3.0	51

1 Belgium, Britain, Denmark, Greece, Ireland, Italy, France, Luxembourg, Netherlands, Portugal, Spain, and West Germany.

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

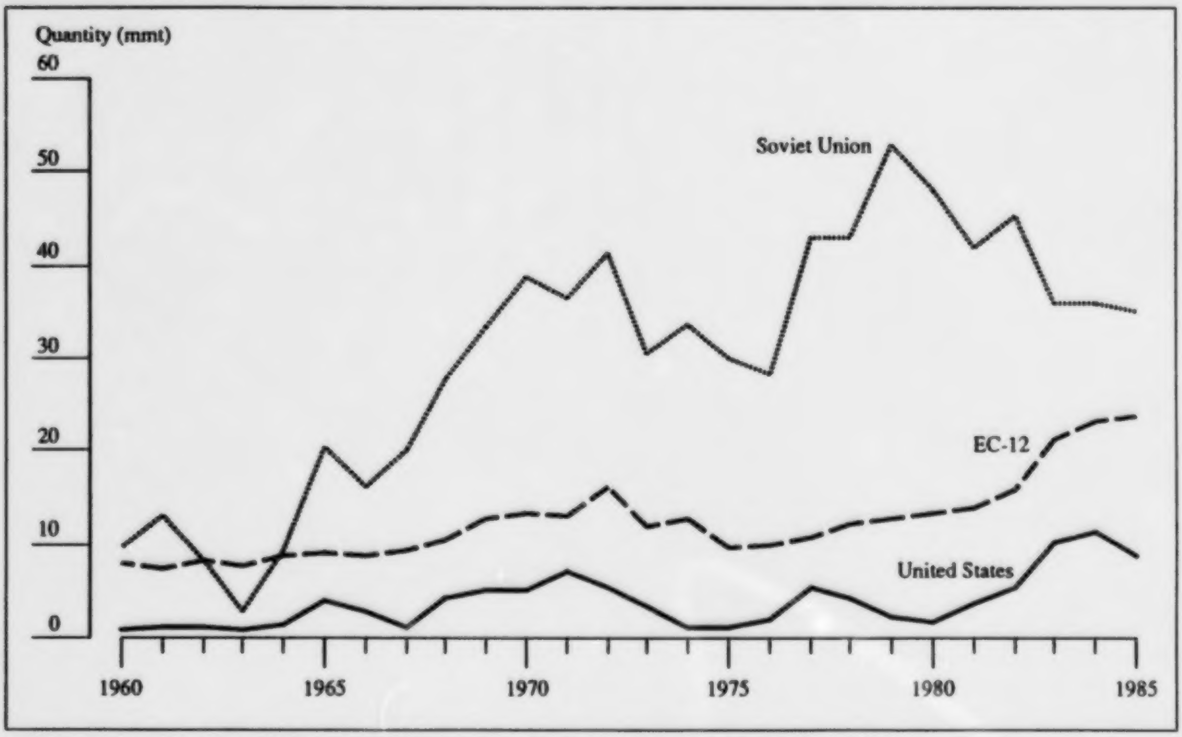
the rise in the value of the U.S. dollar, caused U.S.-dollar prices to fall but allowed other exporters to raise prices internally in their own currency. Thus production expanded in other exporting countries/regions partly because of this, while the United States attempted to reduce production. Details are presented in the next chapter. The important point to note here is that U.S. policy does have a major impact on world markets.

Canada and the United States have historically been the only major stockholders in the world's grain (wheat) markets. The United States accumulates stocks under the loan program and the Farmer-Owned Reserve. Canada holds it stocks mainly on farms by using the delivery quota system; thus changes in stocks also influence domestic-policy choice. Chart 2-11 shows the ratio of wheat stocks to production in Canada and the United States. In most periods up until the 1980s, Canada held higher relative stocks, even though the total volume was lower. Two things are apparent. Stock/production ratios are very unstable, and high levels of stocks precipitate policy change (e.g., LIFT in Canada in 1970, and PIK in the United States in 1983).

The European Community's switch from being a large importer to being the third largest exporter is a major structural change. It is now one of five major exporters of wheat

Chart 2-8

Use of Wheat for Feed in the Soviet Union, the European Community, and the United States, 1960-85



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

to have emerged in the last decade. Recall that at one time the United Kingdom and West Germany were Canada's largest markets. A fuller discussion follows.

Major Importers

While grain, and particularly wheat, exports remain concentrated, import destinations have diversified, as CPEs and LDCs have become more important. Table 2-11 shows the import patterns of five important countries and four regions; these patterns are somewhat divergent.

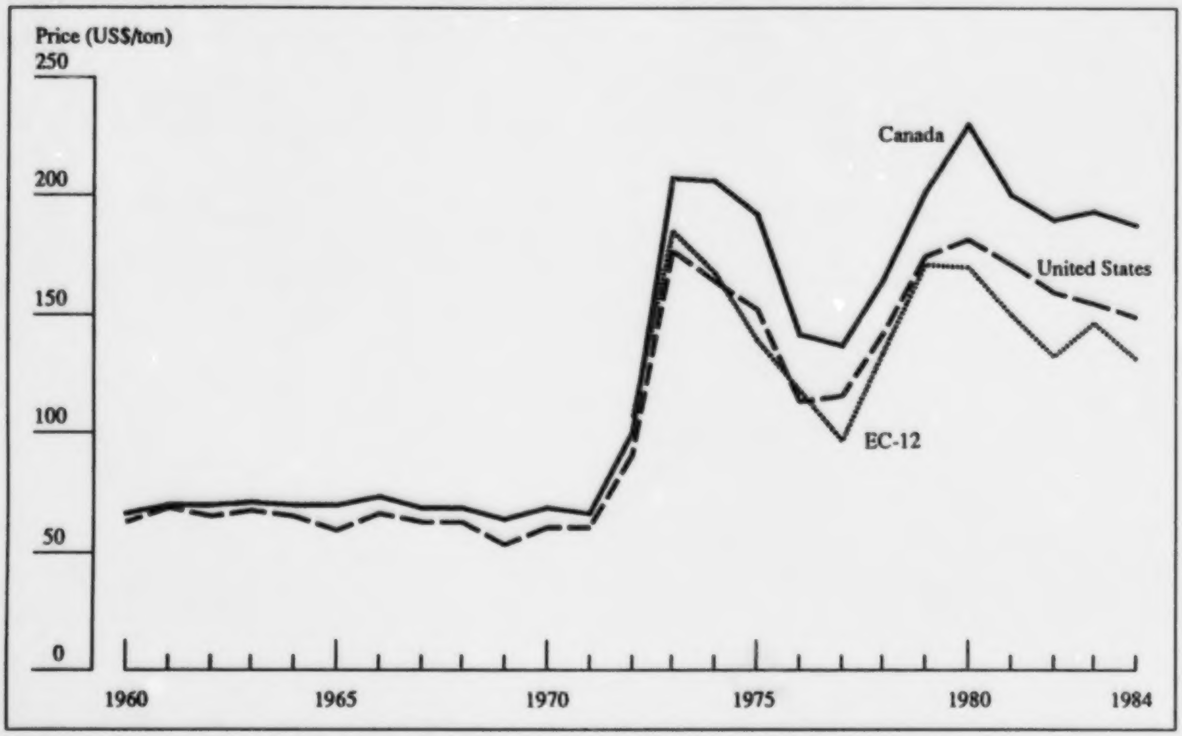
China was a small importer in the 1960s and throughout most of the 1970s. It then rapidly increased its imports of both wheat and feed grains, with wheat imports alone having peaked in the early 1980s at nearly 14 mmt. Since 1983, China's imports of wheat have dropped, and it has begun exporting corn. In 1987, however, China once again emerged as a large grain importer. This fluctuation in China's export position can be attributed to significant policy changes after 1978. It is unlikely that China can sustain the rate of increase in production experienced in the period 1980-85 (an increase of 56 per cent for wheat) over the long run. Further rapid growth in income resulting from economic liberalization will expand demand for meat – and therefore feed grains. The issue of China's net trade position in the future is difficult to forecast.

Egypt has emerged as an importer whose imports are steadily increasing as domestic demand outstrips production in a severely constrained land area. Most of Egypt's imports are in concessional terms, however, and are therefore sensitive to donor policy.

India has ceased to be an importer of any great significance; because of its size, however, it must nonetheless be considered a potentially influential player. It is discussed in more detail in the following section.

Chart 2-9

Export Price of Wheat, Crop Years 1960/61 to 1984/85



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Japan is a steady importer of between 5 and 6 million tons. High incomes and slow population growth rates suggest little growth in demand for wheat. Japan is a much larger importer of feed grains and oilseeds. The growth in demand for feed stuffs is also likely to slow, even as Japanese incomes rise still further.

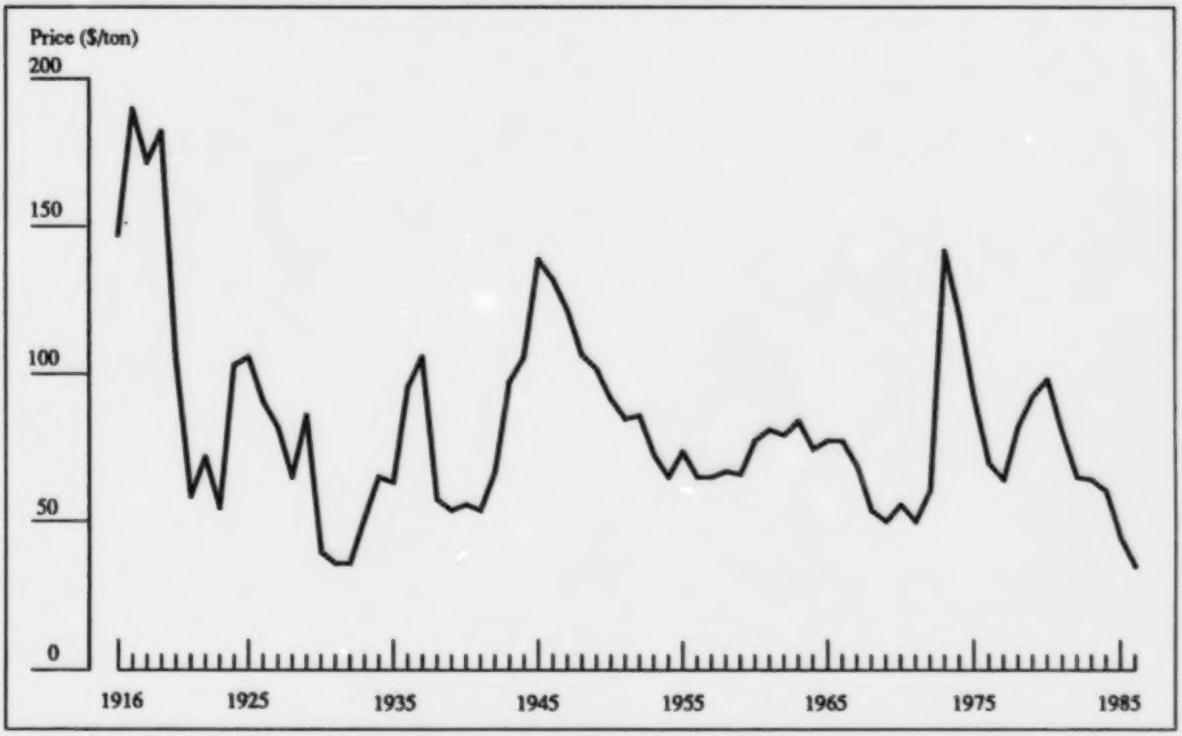
The *Soviet Union* is the world's largest and most erratic importer of wheat and coarse grains. That is a recent development. The Soviet Union had generally been a significant exporter of grain until 1972, when through an apparent policy change it began to import in order to cover production shortfalls, causing it to become a large importer of both wheat and coarse grains. Chart 2-12 plots Soviet production and its imports of coarse grains. Coarse-grain imports since 1970 appear to be inversely related to highly variable production; the same is true with respect to wheat. Thus the Soviet Union, either by design or accident, has become a major player and a potential market destabilizer.

The remaining four columns in Table 2-11 chronicle the evolution of imports to four developing regions. *Latin America* is a small but stable importer, of no great significance to world markets. Similarly, despite the current attention being given to Africa, *Sub-Sahara Africa* is a small, but growing, importer of wheat. *Developing Asia* (excluding China) imports around 10 mmt. The major growth market for wheat has been the region including *North Africa* and the *Middle East*. As a result of rising incomes and foreign-exchange availability – both the result of OPEC – this region's demand for wheat has grown rapidly, from less than 5 mmt to over 20 mmt. This region has also greatly increased its imports of coarse grains.

These five countries and four regions accounted for almost 80 mmt of imports in 1985, well over 80 per cent of the world's wheat trade. Clearly, then, developments in those areas are critical for the future of the Prairie grain economy.

Chart 2-10

Deflated Price Received by Farmers for Spring Wheat, Saskatchewan, 1916-86



SOURCE Compiled from Saskatchewan Department of Agriculture, *Agricultural Statistics, 1985*; Statistics Canada, *Historical Statistics of Canada*, Series K8-18; and Statistics Canada, *Consumer Price Index, 1986*, Cat. 62-001.

Canada's shipments of wheat to various regions and countries are presented in Table 2-12. It emphasizes, again, both the declining importance of Western Europe and Canada's growing dependence on the volatile market of the Soviet Union, although it should be noted that Canada's exports to the latter are much more stable than overall U.S.S.R. wheat imports. In addition to the major markets shown in Table 2-12, Canada's exports have also increased to other countries, such as Iraq, Brazil, Algeria, and Syria.

The Special Case of the European Community

The major structural change in the world market for grain since 1960 has been the phenomenal growth in grain production in the European Community. On a relatively static area of 35 million hectares, EC grain production has doubled from about 80 mmt to 160 mmt. Given its slow population growth and moderately rising incomes, production increases have exceeded growth in domestic utilization, changing the European Community from a large importer (25 mmt in 1961) to a net exporter of both wheat and coarse grains in 1985 (over 15 mmt). This major structural change resulted from a doubling of yields and improved efficiency, stimulated mainly by high, rising, and stable internal-support prices under the Common Agricultural Policy (CAP). The developments in the EC-12, for both wheat and coarse grains, are presented in Table 2-13. Growth in wheat exports in the 1980s has been rapid. Net coarse-grain imports increased until the mid-1970s, when income growth stimulated demand for meat; they then declined steadily until 1985, when the European Community became a small net exporter.

Unless there is a major change in EC policy, it is quite likely that these trends will continue; or, stated more directly, the European Community is now irreversibly in

Table 2-10

World Trade in Wheat and Its Major Exporters, 1960-85

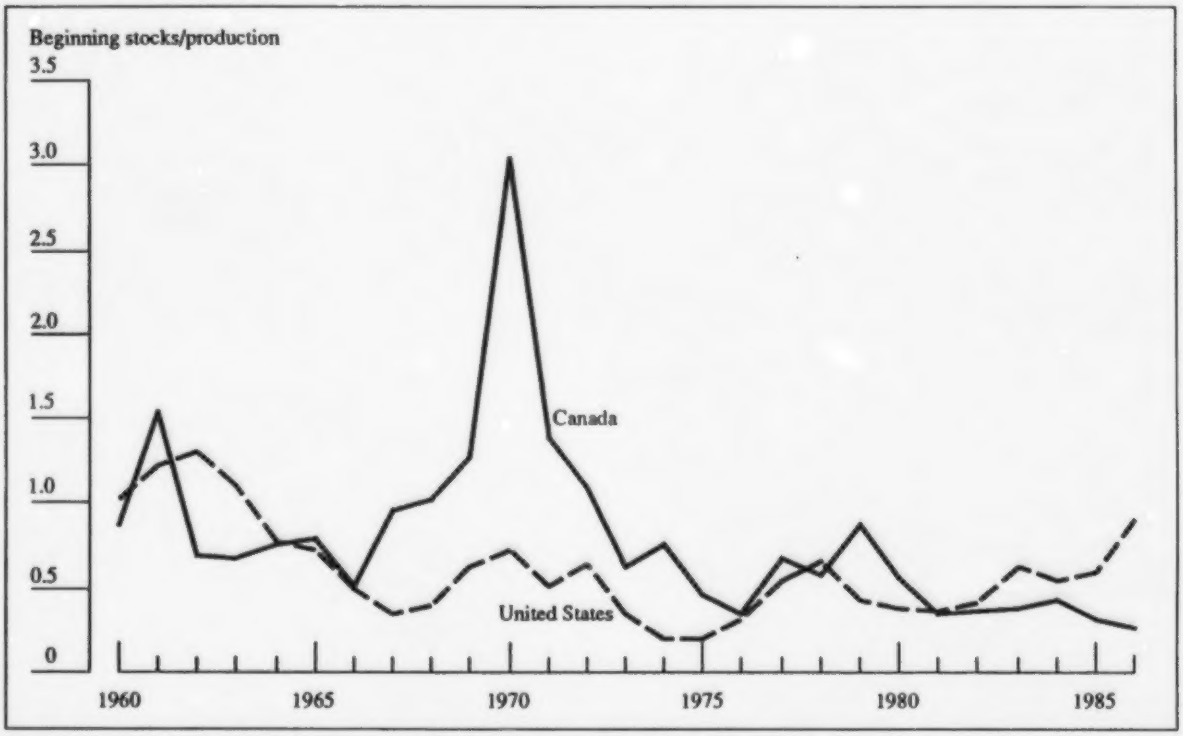
	Argentina		Australia		Canada		EC-12 net exports[1]		United States		
	Wheat exports	Market share	Wheat exports	Market share	Wheat exports	Market share	Wheat exports	Market share	Wheat exports	Market share	World trade
	(mmt)	(%)	(mmt)	(%)	(mmt)	(%)	(mmt)	(%)	(mmt)	(%)	(mmt)
1960	1.1	3	6.5	15	9.6	22	–10.3	(24)	17.8	41	43.8
1961	2.7	6	4.9	10	9.7	21	–10.1	(21)	19.5	41	47.0
1962	1.8	4	6.1	13	9.0	19	–4.7	(10)	17.7	38	46.2
1963	3.5	6	7.0	12	16.2	28	–5.8	(10)	23.0	40	58.2
1964	6.3	11	7.3	13	10.9	20	–3.1	(6)	19.7	36	54.9
1965	5.6	9	4.7	8	15.9	26	–4.0	(7)	23.2	38	61.1
1966	2.2	4	8.5	15	14.0	24	–4.4	(8)	21.0	36	58.4
1967	2.2	4	8.6	10	9.1	17	–2.1	(4)	20.8	39	53.4
1968	2.5	5	6.4	13	8.3	17	–2.8	(6)	14.8	29	50.3
1969	2.3	4	8.0	14	9.4	17	–1.4	(3)	16.4	29	55.8
1970	1.0	2	9.1	16	11.8	21	–6.8	(12)	20.2	36	56.5
1971	1.6	3	7.8	14	13.7	24	–2.4	(4)	16.3	29	56.1
1972	3.2	4	4.3	6	15.7	22	–0.1	--	30.4	42	71.6
1973	1.6	2	7.0	10	11.4	16	–0.6	--	33.1	45	73.0
1974	1.8	3	8.5	12	10.7	16	1.9	3	27.7	40	68.4
1975	3.2	4	8.7	12	12.3	17	2.2	3	31.9	43	74.0
1976	5.9	8	9.5	13	13.4	19	0.8	1	25.9	37	70.8
1977	1.8	2	8.1	11	16.0	21	–0.7	(1)	30.6	41	75.5
1978	4.1	5	11.7	14	13.0	15	3.6	4	32.5	39	84.0
1979	4.8	5	13.2	14	15.9	17	5.9	6	37.4	40	93.3
1980	3.8	4	9.6	10	16.3	17	10.3	11	41.2	43	96.9
1981	3.6	3	11.0	10	18.4	17	10.3	10	48.2	45	107.8
1982	9.9	9	7.3	7	21.4	20	11.8	11	41.1	38	107.0
1983	7.8	7	13.3	12	21.8	20	11.9	11	38.9	35	110.4
1984	9.4	8	14.0	12	17.5	15	15.3	13	38.8	33	115.9
1985	4.2	4	15.5	16	18.0	18	14.2	15	24.5	25	97.8

[1] Minus signs denote net imports; parentheses denote import shares.

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Chart 2-11

Ratio of Wheat Stocks to Production, Canada and the United States, 1960-86



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

the export column. That leaves Japan and other Western European countries as the only importers in the DC category. The inescapable conclusion is that developed countries will continue to decline in relative importance as grain importers.

Influential Marginal Traders – India and China

Four countries (China, the Soviet Union, the United States, and India) and one region (the European Community) accounted for over 70 per cent of the world's wheat production in 1985. Two are now large exporters; one is a major but sporadic importer; and two (India and China) trade on the margin. Given the significance of the latter two for world production and consumption of wheat, marginal internal changes could have significant impacts on the world market. Therefore each is discussed here briefly.

India

In the mid-1960s, India was considered the world's "basket case." Production and yields were low and vulnerable to the monsoon. This vulnerability was highlighted in 1965-67 when two "bad" monsoons caused falls in production and the need for massive food-aid shipments. Since then, India's wheat yields have more than doubled (the Green Revolution), and production has tripled. Imports have fallen to nearly zero, and India has become a small potential exporter in recent years. The Indian story is found in Table 2-14. It is unlikely that India will become a major exporter, but it could still be a significant importer on occasion (if, for example, a second bad monsoon should occur in 1988). That is because stocks were significantly reduced in 1987. Furthermore, if India, by a combination of incentives, policies, and investment in technology generation, has succeeded in feeding its own, it may be a harbinger for other LDCs. For example, the phenomenal

Table 2-11

Major World Importers of Wheat, by Country or Region, 1960-85

	Country					Region			
	China	Egypt	India	Japan	Soviet Union[1]	Sub-Sahara Africa	Developing Asia	Latin America, excluding Argentina	North Africa and the Middle East
					(mmt)				
1960	1.9	1.0	4.4	2.8	–4.4	0.6	7.7	2.4	4.2
1961	4.9	1.7	2.8	2.8	–5.1	0.7	6.2	1.6	6.2
1962	4.9	1.7	3.5	2.6	–5.5	0.8	7.6	2.4	4.4
1963	5.2	1.9	4.2	3.8	7.1	0.8	8.7	1.1	4.0
1964	5.0	2.0	6.0	3.5	0.2	0.9	10.2	–2.5	4.8
1965	6.3	2.3	7.2	3.4	5.9	1.1	11.1	–1.2	4.9
1966	5.0	2.5	8.0	4.2	–1.3	1.4	13.4	3.3	7.1
1967	4.2	2.8	6.4	4.0	–3.8	1.0	12.4	3.6	6.7
1968	3.5	1.9	4.4	4.1	–5.6	1.0	10.4	3.3	5.1
1969	5.1	2.2	3.2	4.4	–5.3	1.3	10.2	2.4	6.2
1970	3.7	2.8	2.9	4.8	–6.7	1.8	9.4	3.6	8.8
1971	3.0	2.6	1.7	4.9	–2.3	1.9	9.9	4.0	9.0
1972	5.3	3.0	–0.2	5.4	14.3	1.7	10.0	4.8	6.2
1973	5.6	3.1	3.2	5.3	–0.5	2.0	12.4	6.1	10.7
1974	5.7	3.5	5.0	5.4	–1.5	1.9	14.0	4.6	12.4
1975	2.2	3.8	6.9	5.9	9.7	2.1	15.2	4.5	12.0
1976	3.1	3.9	5.1	5.5	3.7	2.5	13.1	1.2	11.5
1977	8.6	4.3	–0.2	5.8	5.6	3.0	10.0	6.8	13.7
1978	8.0	5.1	–0.6	5.7	3.7	3.5	9.9	5.6	12.8
1979	8.9	4.9	–0.5	5.9	11.6	3.5	9.8	5.9	17.1
1980	13.8	5.4	– –	5.8	16.0	3.9	9.1	6.2	17.1
1981	13.2	5.9	2.0	5.4	19.0	4.2	11.2	6.7	18.4
1982	13.0	5.5	2.4	5.5	20.0	4.1	12.2	–0.5	17.0
1983	9.6	5.9	3.3	5.6	20.0	4.8	14.0	2.3	22.9
1984	7.4	6.9	0.6	5.3	27.0	5.9	13.0	1.2	24.8
1985	6.5	6.5	–0.4	5.3	17.0	5.4	11.6	4.3	22.7

[1] Minus signs denote net exports.

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

increases in Bangladesh's wheat production could be replicated elsewhere. The implications of this for a world wheat market that is now dominated by LDC importers could be significant.

China

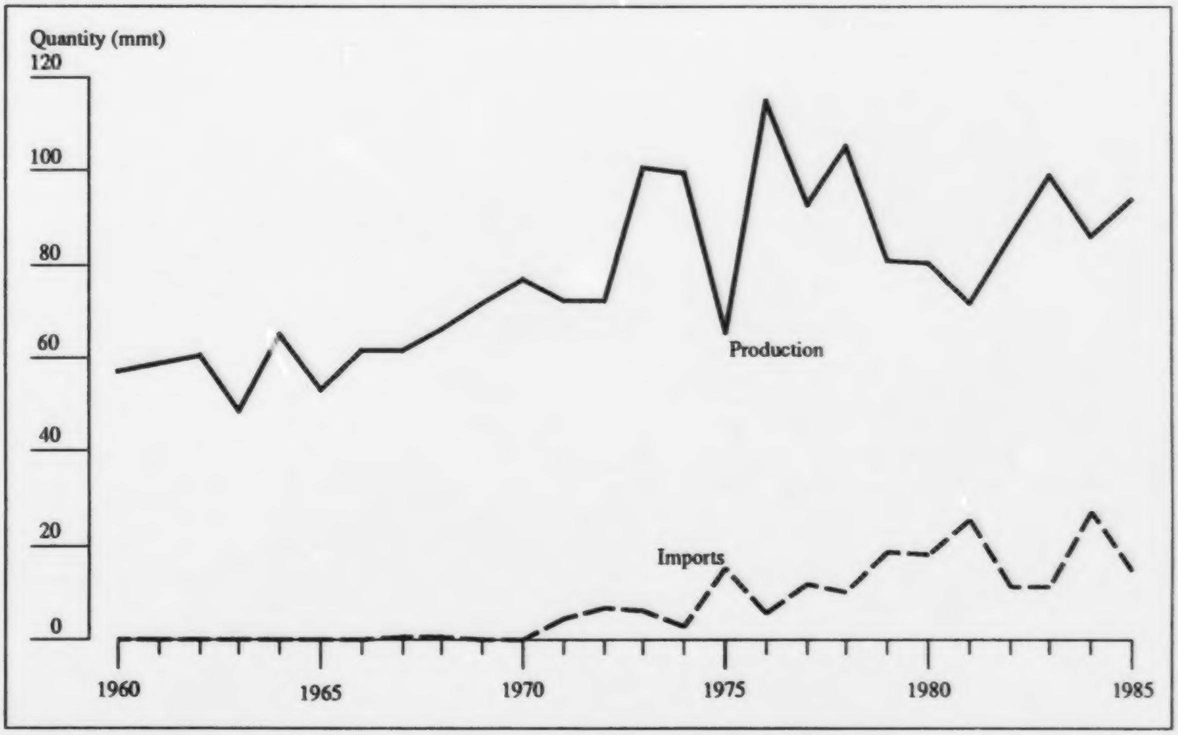
The Chinese story is equally interesting and is portrayed in Table 2-15. China was the world's largest producer of wheat in 1985. Since 1960, production has increased fourfold, mainly because of yield increases. Growth in yields and production has been particularly rapid since 1980. As noted earlier, much of this results from policy reform, which increased the efficiency of production. China, particularly in terms of demand for coarse grains, as well as wheat, is the major conundrum in world markets.

A Summary Overview

There have been significant changes in the world's grain markets, with implications for Canada. First, Canada sells

Chart 2-12

Coarse-Grain Production and Imports in the Soviet Union, 1960-85



SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

the largest share of its wheat to CPEs. Second, because the major growth in demand has been for high-yielding, lower-protein wheats, Canada's future in the production and exportation of high-protein wheats is unclear. Importers of Canadian wheat, such as Japan, buy only high-quality wheat; others buy low grades as well. Canada, however, has responded by allowing the licensing and production of certain high-yielding varieties; for example, HY320 was licensed in 1985. As a result, producers in Canada now have the option of growing both high-quality and low-quality wheats. Canada has maintained its market share of exports over time in spite of the fact that the major growth in world production outlined earlier came about because of the adoption of high-yielding, low-protein varieties in other countries. The Green Revolution in countries such as India and Pakistan was a result of the adoption of high-yielding varieties. As a result, yield increases in Canada have been lower than those of many other regions; that is partly due to the difference in the quality of wheat grown.

The grain markets, because they are influenced by weather, government policies, and technology, have stocks as one of their key ingredients. Stock levels are shown in Chart 2-13. World stocks fluctuate, as do those of some of the key players. Stocks fell in the early 1970s, accompanied by the rise in price shown earlier. As production increased, however, stocks once again began to accumulate, since consumption did not keep up with production. The largest holder of wheat stocks is the United States, followed by Canada. Note, however, that between 1965 and 1970 Canada held roughly the same amount of stocks as did the United States. Also note that Canada's stock levels during the 1970s and early 1980s were relatively stable, while U.S. stocks rose. Note, too, that despite rapid increases in EC production and exports, it holds very few stocks.

This quick overview of the world's grain market has emphasized that it is a market on which a few large countries

Table 2-12

Canadian Exports of Wheat and Wheat Flour to Major Destinations, Crop Years 1960/61 to 1985/86

	Destination					Total exports to all destinations
	Western Europe	Eastern Europe	Soviet Union	China	Japan	
	(Thousands of tons)					
1960/61	4,991	457	204	775	1,520	9,307
1961/62	4,660	754	–	1,968	1,331	9,938
1962/63	4,176	24	1	1,678	1,262	9,015
1963/64	4,799	439	5,686	1,005	1,309	15,088
1964/65	3,983	1,927	931	1,758	1,433	11,909
1965/66	3,660	852	5,168	2,053	1,285	14,833
1966/67	3,839	928	2,712	2,465	1,620	14,833
1967/68	3,213	360	1,372	1,367	1,098	8,902
1968/69	3,053	293	147	2,127	1,247	8,700
1969/70	2,824	179	1,105	1,830	1,068	8,999
1970/71	3,575	126	315	2,346	1,029	11,561
1971/72	2,892	122	2,821	2,967	1,388	13,716
1972/73	2,335	142	4,168	4,374	1,364	15,648
1973/74	2,658	224	1,596	1,367	1,692	11,737
1974/75	2,724	117	313	2,366	1,187	11,168
1975/76	2,289	848	3,151	1,204	1,601	12,136
1976/77	2,750	1,248	1,183	1,929	1,321	12,904
1977/78	3,345	734	1,688	3,321	1,352	15,899
1978/79	2,367	555	1,892	3,181	1,236	13,471
1979/80	2,590	1,550	1,806	2,621	1,300	14,958
1980/81	2,352	1,244	4,464	2,911	1,463	17,016
1981/82	2,159	1,525	4,779	2,991	1,335	17,751
1982/83	2,165	1,036	6,953	4,242	1,357	21,120
1983/84	2,038	130	6,761	3,514	1,527	21,764
1984/85	1,217	265	6,019	2,845	1,324	17,540
1985/86	1,536	287	5,219	2,614	1,272	17,683

SOURCE Data for crop years 1960/61 to 1982/83 are from International Wheat Council, *World Wheat Statistics* (London, England: IWC, various issues); for crop years 1983/84 to 1985/86, from Canadian Grain Commission, *Canadian Grain Exports* (Ottawa: CGC, various years).

Table 2-13

EC-12[1] Production and Net Trade in Wheat and Coarse Grains, 1960-85

	Wheat				Coarse grains			
	Production	Imports	Exports	Net trade[2]	Production	Imports	Exports	Net trade[2]
	(mmt)							
1960	33.7	12.9	2.6	−10.3	46.4	15.1	2.6	−12.5
1961	32.1	13.4	3.3	−10.1	44.5	19.0	3.3	−15.7
1962	41.9	9.0	4.3	−4.7	48.1	19.6	2.7	−16.9
1963	35.3	10.2	4.4	−5.8	52.4	21.4	4.4	−17.0
1964	40.5	9.3	6.2	−3.1	51.5	21.0	4.8	−16.2
1965	42.9	10.5	6.5	−4.0	52.6	26.9	5.6	−21.3
1966	37.7	10.0	5.6	−4.4	54.2	26.0	6.2	−19.8
1967	44.2	9.4	7.3	−2.1	61.5	25.0	6.3	−18.7
1968	44.4	12.0	9.2	−2.8	62.6	22.7	7.8	−14.9
1969	42.5	11.8	10.4	−1.4	64.7	23.2	8.8	−14.4
1970	41.3	12.7	5.8	−6.9	61.3	27.3	8.5	−18.8
1971	48.3	11.4	9.0	−2.4	70.6	26.3	10.8	−15.5
1972	48.4	12.2	12.1	−0.1	71.4	27.6	11.0	−16.6
1973	47.7	12.4	11.8	−0.6	74.1	33.1	13.8	−19.3
1974	52.7	10.4	12.3	1.9	73.6	31.5	11.1	−20.4
1975	45.1	12.3	14.5	2.2	71.1	31.8	12.6	−19.2
1976	46.6	10.2	10.9	0.5	61.9	39.0	9.7	−29.3
1977	44.5	13.3	12.7	−0.6	76.6	32.6	13.3	−19.3
1978	55.3	11.7	15.3	3.6	81.9	31.1	13.2	−17.9
1979	53.2	12.0	17.8	5.8	79.2	31.0	13.3	−17.7
1980	61.5	11.4	21.7	10.3	82.6	28.3	15.0	−13.3
1981	58.1	12.1	22.1	10.0	76.1	30.4	14.4	−16.0
1982	64.7	10.1	21.9	11.8	80.7	29.9	15.0	−14.9
1983	63.8	10.9	22.7	11.8	73.9	23.2	14.7	−8.5
1984	82.8	13.1	28.4	15.3	89.7	20.3	19.3	−1.0
1985	71.8	15.1	29.3	14.2	87.8	19.2	20.7	1.5

[1] Belgium, Britain, Denmark, Greece, Ireland, Italy, France, Luxembourg, Netherlands, Portugal, Spain, and West Germany.

[2] Minus sign denotes net imports.

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Table 2-14

Supply and Utilization of Wheat in India, 1960-85

	Area harvested	Yield	Production	Total imports	Total exports	Total consumption
	(Thousands of hectares)	(mt/ha)	(Thousands of tons)			
1960	13,380	0.77	10,320	4,398	--	14,218
1961	12,927	0.85	10,995	2,798	--	13,893
1962	13,570	0.88	12,076	3,546	--	14,822
1963	13,590	0.79	10,779	4,275	--	16,054
1964	13,499	0.72	9,854	5,977	--	16,531
1965	13,422	0.91	12,258	7,157	--	18,115
1966	12,572	0.82	10,394	8,030	--	19,324
1967	12,838	0.88	11,393	6,393	--	17,786
1968	14,998	1.10	16,540	4,355	1	19,294
1969	15,958	1.16	18,651	3,188	14	21,725
1970	16,626	1.20	20,093	2,927	13	22,007
1971	18,241	1.30	23,832	1,749	5	23,576
1972	19,139	1.37	26,410	502	667	28,245
1973	19,463	1.27	24,735	3,243	--	30,178
1974	18,583	1.17	21,778	4,970	--	27,048
1975	18,010	1.33	24,104	6,900	--	27,004
1976	20,454	1.41	28,846	5,066	--	28,412
1977	20,922	1.38	29,010	298	536	30,772
1978	21,456	1.47	31,749	50	614	33,685
1979	22,641	1.56	35,508	--	481	36,027
1980	22,172	1.43	31,830	50	55	34,325
1981	22,279	1.62	36,313	2,000	--	36,313
1982	22,144	1.69	37,452	2,486	100	37,838
1983	23,567	1.81	42,794	3,270	35	42,029
1984	24,672	1.84	45,476	700	100	43,076
1985	24,400	1.81	44,229	100	460	43,369

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Table 2-15

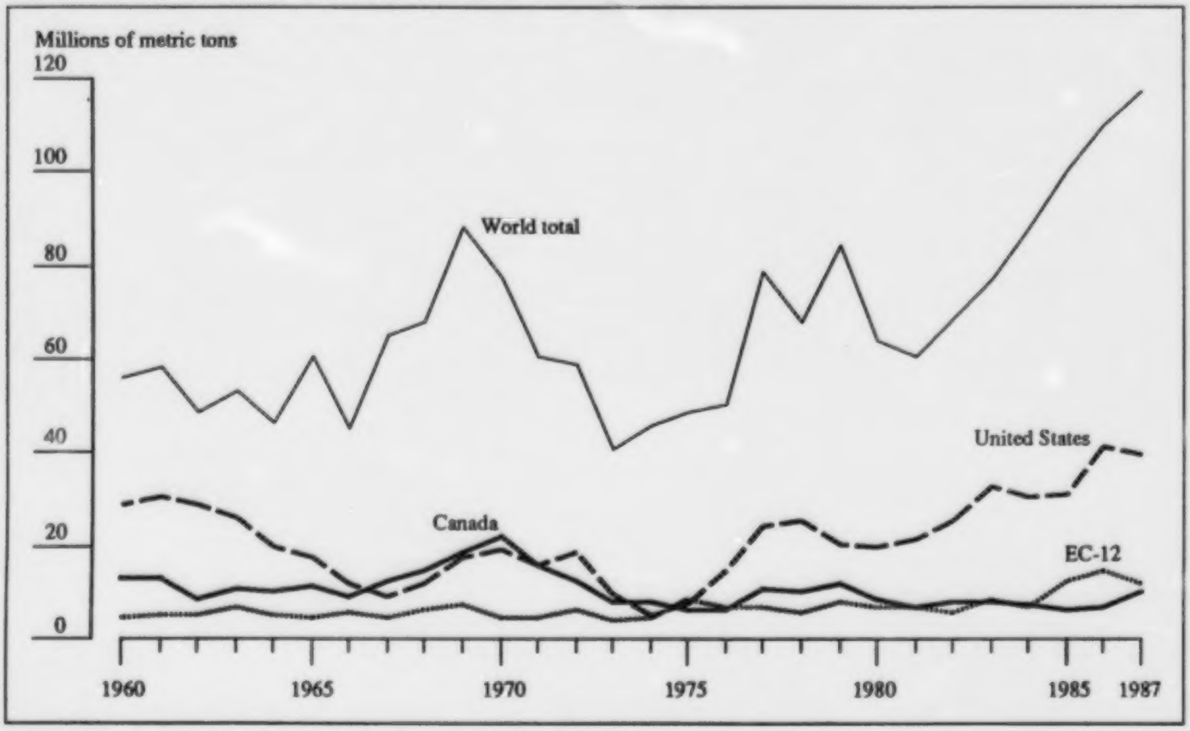
Supply and Utilization of Wheat in the People's Republic of China, 1960-85

	Area harvested	Yield	Production	Total imports	Total consumption
	(Thousands of hectares)	(mt/ha)	(Thousands of tons)		
1960	26,800	0.78	20,960	1,949	22,907
1961	25,572	0.55	14,250	4,893	19,021
1962	24,075	0.69	16,665	4,892	21,468
1963	23,771	0.77	18,475	5,208	23,570
1964	25,408	0.82	20,840	5,032	25,757
1965	24,709	1.02	25,220	6,282	31,498
1966	23,919	1.05	25,280	5,025	30,275
1967	25,299	1.12	28,485	4,156	32,628
1968	24,658	1.11	27,455	3,537	30,991
1969	25,162	1.08	27,285	5,125	32,409
1970	25,458	1.14	29,185	3,661	32,843
1971	25,639	1.27	32,575	2,968	35,538
1972	26,302	1.36	35,985	5,290	41,270
1973	26,439	1.33	35,225	5,645	40,865
1974	27,061	1.51	40,865	5,746	46,606
1975	27,661	1.63	45,310	2,200	47,510
1976	28,417	1.77	50,385	3,158	53,543
1977	28,065	1.46	41,075	8,600	49,675
1978	29,183	1.84	53,840	8,047	61,887
1979	29,357	2.13	62,730	8,865	71,595
1980	29,228	1.88	55,210	13,789	68,999
1981	28,307	2.10	59,640	13,200	72,840
1982	27,940	2.44	68,420	13,000	81,420
1983	29,050	2.80	81,390	9,600	90,990
1984	29,576	2.96	87,815	7,400	95,215
1985	29,350	2.93	86,000	6,500	92,500

SOURCE Based on data from the U.S. Department of Agriculture, Foreign Agricultural Service, Washington, D.C.

Chart 2-13

Year-End Stocks of Wheat in the World, Selected Countries, 1960-87



SOURCE Based on data from selected U.S. Department of Agriculture reports.

(not necessarily large traders) will have significant impacts in the future, at the same time affecting Canada's potential role. This set would include, as a minimum, the United States, the European Community, the Soviet Union, and China. Possible additions could be Canada, Argentina, Australia, and India. In all cases, significant changes in policy and/or productivity will have a major impact on world-market developments.

3 Grain Markets and Policy Interdependence

Government policies influence the nature of the grain market, as discussed in Chapter 2. Grain markets are highly distorted by government involvement, which results in significant price differences between regions, distortions in production, and increased price volatility and uncertainty. A major policy change in one large country can have a bearing on the success of other countries in achieving their policy objectives. It is that policy interdependence that is the focus of this chapter. A political-economy framework is used to develop a plausible policy scenario on what happened in the 1980s (the period when grain markets collapsed) and to suggest what scenario may lie ahead. Because the U.S. grain market is so large, the primary focus is on U.S. policy and on how other countries respond to U.S. policy changes and, in turn, how the United States responds to their policy adjustments. It is a dynamic game of action, reaction, and response. To understand what happened under the U.S. *Food Security Act* of 1985 and its aftermath, it is necessary to understand what happened prior to 1985 that created the conditions that led to such apparently drastic changes in U.S. policy. After that, we can move forward to the late 1980s and speculate about the future.

Conditions Leading Up to the 1985 U.S. Farm Program

In the period from 1972 to 1981, agricultural exports grew at unprecedented rates. Stocks were depleted (see Chart 2-11); prices rose sharply in the early 1970s, dipped in the mid-1970s, and regained high levels by 1979/80 (see Chart 2-7). Production of both wheat and coarse grains increased substantially in the United States, as significant amounts of idled land were brought into production (Charts 2-2 and 2-5). Also, the U.S. market share increased (Table 2-10), and stocks were reduced. It was also a period of rising inflation rates, easy monetary policy, and floating exchange rates. The two devaluations of the U.S. dollar in 1971 and 1973, and the dollar's fall in the late 1970s, stimulated U.S. (as well as Canadian and Australian) exports. Interest rates rose less rapidly than prices, resulting in negative real interest rates. Attractive interest rates and high prices pulled idled land – especially in the United States – back into production and increased acreages as well as yields. During that period, also, high prices were inducing very rapid yield increases in Europe (Chart 2-3). Recycled OPEC-oil dollars further stimulated demand in the OPEC countries and the LDCs. It was a period of explosive growth and unending optimism for farmers and policymakers in the exporting countries of the world.

More than in any other country, agricultural policy in the United States has a built-in political adjustment mechanism to enable adaptation to recent changes in economic conditions. That comes about from the finite duration (usually four or five years) of U.S. Farm Bills. There was a major Farm Bill in 1973 that, among other things, formalized target prices above loan rates; and, if needed, deficiency payments were to be used. The "target price" is the price guaranteed to producers who agree to "set aside" a specified acreage. The "loan rate" is the minimum price to producers. If the market price is below the target price, producers receive direct (deficiency) payments equal to the difference between the target price and the higher of either the market price or the loan rate. In 1973, however, market prices were so high that those instruments were viewed as unimportant because they would only provide a safety net for sharp falls in prices, which it was hoped would not occur. The 1977 Farm Bill raised target prices and loan rates; but because they were still below market prices, the increases were perceived to be politically advantageous and economically costless. It also introduced the Farmer-Owned Reserve, which greatly expanded potential U.S. stock holdings.

By 1980, the U.S. dollar was at an all-time low, and inflation was pushing up nominal grain prices, even though the underlying demand was certainly weakening. Clearly, U.S. policymakers, in drafting the 1981 Farm Bill, must have anticipated that those conditions would continue, because in the 1981 Act they not only raised loan rates and target prices; they also mandated increases in target prices at the, then, inflation rate of around 10 per cent. Furthermore, they reduced the Secretary of Agriculture's discretion, so he could not lower loan rates. In retrospect, it is likely that policymakers, based on the experience of the 1970s, felt they were simply adjusting the safety net to take account of higher rates of inflation. If the 1980s had been a continuation of the 1970s – with rapid economic growth, rising prices, easy money, and a declining dollar – the 1981 Farm Bill could very well have been judged by policymakers to be as "successful" as the 1973 and 1977 Acts.

But, alas, such was not to be the scheme of things. Agricultural policymakers did not anticipate that the switch to tight money by Chairman Volker of the U.S. Federal Reserve Board in October 1979 would so quickly bring down inflation rates, contribute to a U.S. (and then a global) recession, increase real interest rates, and rapidly appreciate the U.S. dollar. The combination of the global recession, the heightening debt crisis, and expanding European production caused global export demand to contract. That, coupled with the rising U.S. dollar, caused world prices (denominated in U.S. dollars) in the world's grain markets to plunge. Note, however, that for exporting countries whose currencies were depreciating against the U.S. dollar, the price fall was not nearly so severe as in the United States.

As world prices fell, U.S. prices soon came to rest on a fixed U.S. loan rate, which caused U.S. stocks to rise and the United States to lose competitiveness. The U.S. market share fell from over 45 per cent of the wheat market to a low of 25 per cent in 1985/86. The United States responded with a unilateral supply control through the Payment-in-Kind program (PIK) in 1983. The PIK program directly compensated producers having grain stocks for withdrawing land from production. By 1985, however, the low prices, rising stocks, lost market share, and sharply escalating fiscal costs convinced U.S. policymakers that major changes had to occur.

One cannot understand the 1985 U.S. *Food Security Act* and its aftermath without appreciating the economic and political environment in which it was drafted. The United States, by its own policy choice of fixed nominal support prices and a complete macroeconomic reversal, had literally priced itself out of world markets and had encouraged expanded production in countries whose currencies had been depreciating against the U.S. dollar. Those countries could raise prices in local currencies and still be competitive with the falling U.S.-dollar prices in world markets. Recall that the Canadian Wheat Board's initial payments increased from C$128.60/ton in 1979/80 to C$174.50 in 1982/83 and did not fall appreciably until 1985/86. Canadian wheat production averaged less than 20 mmt in the period 1975/76 to 1979/80, but it approached 24 mmt, on average, during the period 1980/81 to 1984/85.[1] As shown in Chart 3-1, however, Canadian prices were reduced, in U.S. dollars, to a level just above the loan rate from 1982/83 until 1984/85. Only in 1985/86 did Canadian prices fall below the loan rate. That would suggest that Canadian wheat remained competitive with U.S. wheat. Similar patterns occurred in Australia and Argentina. Production in the European Community rose steadily from around 42 mmt in the mid-1970s to over 60 mmt in the mid-1980s. In the same period, U.S. exports of wheat fell from their peak of nearly 49 mmt (45 per cent of world trade) in 1981 to less than 25 mmt in 1985 (25 per cent of world trade).

These numbers, and the perception that the United States had lost its leading role in world markets, led to the drastic changes in policy encompassed in the 1985 U.S. *Food Security Act*. It was the feeling of being taken advantage of from all sides that led to a siege mentality and the desire to strike back, to regain its market share, to reduce stocks, and to not be concerned about repercussions for either friend or foe. The U.S. policy analysts probably reasoned that if production in other countries rose in response to rising prices, it would drop with falling prices. The extent to which that is true would depend fundamentally on the policy responses in other countries. Such policy interdependence must be recognized if we are to understand future developments in the world's grain markets.

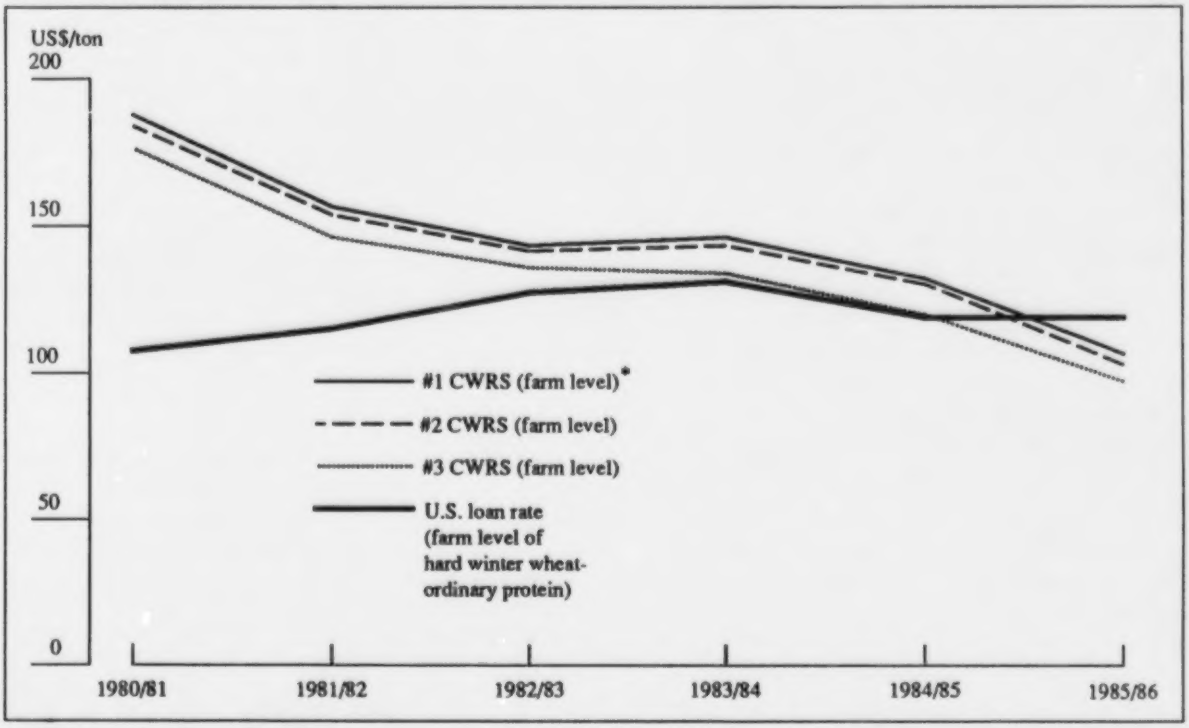
From a Canadian perspective, additional factors should be noted concerning the loss in the U.S. market share in the 1980s. First, the U.S. loss was not at the expense of an increase in Canada's market share; instead, the increase in market share was in the European Community. Second, because of Canada's high-quality wheat and because of political factors such as the 1980 U.S. Grain Embargo, Canada did not experience a build-up of stocks. As noted above, for most of the period prior to the 1985 Farm Bill, Canadian prices were at least equal to, if not above, the U.S. loan rate.

The 1985 U.S. *Food Security Act*

The 1985 U.S. *Food Security Act*, in terms of instruments and mandated levels of support, was little changed from the 1981 U.S. Farm Bill. Target prices, loan rates, set-asides, the Farmer-Owned Reserve, and deficiency payments were retained. The bill mandated initial reductions in loan rates and subsequent reductions of up to 10 per cent per year over the life of the Bill (1986-90), and more modest reductions in target prices, starting in 1988. It also removed some of the constraints on the discretion of the Secretary of Agriculture. It was the exercise of this discretion – using the so-called Findley Amendment (already on the books) – that allowed the Secretary, if stocks were large, to reduce loan rates still further, by up to 20 per cent. Using both of those authorities, loan rates for wheat, feed grains, soybeans, cotton, and rice were reduced by more than 25 per cent. The wheat loan rate, for example, dropped from $3.30 to $2.40 – a reduction of 37 per cent. The new part of the Bill comprised a greatly expanded Export Enhancement Program (payment-in-kind export subsidies), which is discussed in Chapter 4, and the innovation of a marketing loan for rice and cotton. Under

Chart 3-1

Comparison of U.S. Loan Rate with Canadian Wheat Prices (at Farm Level), Crop Years 1980/81 to 1985/86



* CWRS – Canadian Western Red Spring.

SOURCE Canadian prices from Canadian Wheat Board, *Annual Reports*, 1980/81-1985/86. U.S. loan rate from Department of Agriculture, Economic Research Service, *Wheat Situation* (Washington: USDA/ERS, various issues).

this latter provision, farmers could take out the loan at the published rate and repay at the market price or the loan rate, whichever was lower. This provision for rice, for example, released stocks onto the market at prices well below the loan rate. The Bill also made provisions for the discretionary implementation of marketing loans for grain and soybeans.

With the announcement of the above program in the spring of 1986, prices in the U.S. and world markets fell sharply. Clearly, the United States was willing to incur potentially higher fiscal costs (larger deficiency payments and export subsidies) to move its stocks into world markets. Initially, the export subsidy program was closely targeted at markets where the European Community was perceived to be undercutting U.S. sales; but by December of 1986, with increased mandated expenditures, it became virtually a general program of export subsidies. Since the program was implemented, the U.S. export volume and market share have increased (wheat exports are projected to approach 40 mmt in 1987/88, which would represent a 40-per-cent share), but the value of exports has not recovered to nearly the same extent, lending credence to the argument that the short-run world demand for exports is inelastic. It is difficult to determine how much of the U.S. recovery is policy-induced rather than the result of shifting supply conditions because of the poor crops in 1987 in many parts of the world (e.g., India, China, and the Soviet Union). Whether it is due to production shortfalls or price decreases, however, is not really important because the prevailing U.S. perception, reinforced by farm groups and grain traders, is that an aggressive position on world markets through export subsidies is paying dividends in terms of an increased market share and reduced stocks.

Despite the apparent recovery in U.S. exports, it came very slowly and was of a much smaller magnitude than one would have expected, given the drop of 37 per cent in the loan rate. Also, over the same period, the value of the U.S. dollar fell, which should have contributed to increased exports. The reason for the smaller response is that other exporters implemented their own policy initiatives in response to the U.S. policy changes, which in a number of cases buffered domestic producers against some or all of the impact of the price decline.

Exporter Response to the Implementation of the 1985 U.S. *Food Security Act*

If there were no change in policy in the other exporting countries, the price reductions resulting from the Act and the export subsidies would be felt by farmers in Australia, Argentina, Canada, and the European Community to the extent that the drop in world prices was passed on to farmers. In this naive policy-response model, farm prices would fall in Australia, given that the Australian Wheat Board was committed to a no-cost stabilization policy based on a current-year-centred, three-year moving average of prices. Argentine prices for farmers would also fall, because the principal instrument of intervention was an export tax. Canadian prices could also be expected to fall as the Canadian Wheat Board adjusted initial payments to minimize the chances of pool deficits. Only in the European Community would one expect farm prices to be initially unaffected because of the Common Agricultural Policy (CAP). That is because the internal support prices in the European Community are set by political action and do not respond to market prices. The difference between world prices and EC prices is adjusted by a variable import levy on imports and by a variable export subsidy (restitution payment) on exports. Clearly, export restitution costs would be expected to rise sharply, but there would be no change in internal prices.

The United States might naively have expected three of the four competing exporters' supplies to contract. They might also have expected that in those importing countries (admittedly few) which pass world prices on to the consumers and farmers, import demand would expand. The combination of the contracted, competing export supplies and the increased demand as a result of both the price fall and the contracting domestic production might well cause volume to increase sufficiently to cause export earnings to rise with lower prices (the elastic export-demand scenario).

But, as we noted earlier, this has not happened to date, and the reason ought to be obvious: other countries changed their policies to cushion the impacts on politically powerful farmers. Let us recall what actually happened. First, as should have been expected, other exporters immediately lowered their export prices to meet the U.S. prices. That was perceived as essential to maintaining their market shares. In the cases of Canada and Australia, this involved lower Board Sales prices. In Argentina, export prices are keyed to world prices; and in the European Community, export subsidies were immediately increased to meet both the lower prices and the threat of targeted export subsidies by the United States.

The implications of the drop in the loan rate and the response of other exporters need to be made clear. The resulting fall in the export prices of grain transferred the benefits, financed by exporter treasuries and/or farmers, to importers such as the Soviet Union, China, and Japan. This transfer occurred immediately in the form of lower-priced imports. The cost to exporters – per farmer or per unit of production – would vary directly with the proportion of domestic production exported. Thus the costs fell most heavily on Canada, Australia, and Argentina, all of which export high proportions of their production. From the U.S. perspective, the additional costs of deficiency payments and export subsidies would be partially offset by the reduced costs of storing existing stocks and acquiring new stocks. While it is clear that using export subsidies to dispose of stocks is more expensive than the current U.S. programs (USDA, 1986),[2] nevertheless the cost must have been judged "worthwhile" in order to regain its lost market share. The economics of this choice is detailed in Appendix A.

But that was only the first response, and it was accompanied by rhetoric, of varying degrees of virulence, that decried the insensitivity of the United States to their friends and allies. The second response was more varied.

Australia remained committed to having world prices linked to domestic prices; and wheat, barley, sugar, rice, and cotton producers' prices fell. The cost to Australian grain and other producers was high, but Australia did not significantly adjust domestic policy. The impact of this policy action was cushioned substantially in Australia by the possibility of a significant substitution of sheep and cattle for wheat and by the rising prices for wool and meat on world markets. Both wheat acreage and production fell significantly in 1987.

Argentina's policy response was, first, to reduce the export tax from 15 to 5 per cent in May 1986 and then to eliminate it in 1987. This action followed a strike by farmers, and it cushioned the impact of falling world prices on farm prices and shifted the cost of adjustment from the farmers to the Argentine Treasury. Thus the expected supply adjustment was less than anticipated.

Canada's policy response took place in two stages. First, the Canadian Wheat Board lowered initial payments by C$30/ton ($0.82/bushel) for 1986/87; they were further reduced by C$20/ton for 1987/88. The second response was Canada's Special Grain Program, announced on December 9, 1986; it took the form of a one-time deficiency payment of C$1 billion to "cushion the impact of the subsidy war between the European Economic Community and the United States." Despite the notion of a special one-shot program, a second set of payments – this time, in excess of C$1 billion – was announced in December 1987. Furthermore, the federal government bore the costs of deficits in pool accounts and in the Western Grain Stabilization Fund. Thus a significant portion of the costs of adjustment was shifted from the Board and from farmers to the federal government. Canadians argued, with some justification, that they were compensating farmers for the loss in welfare transferred to importers by lower world prices.

The policy response from Canada was apparently unexpected by the United States, and the implications seem fairly clear. First, Canadian grain acreage is unlikely to be significantly reduced because of the direct compensation and because of the limited alternatives for Prairie farmers. Second, the U.S. policy change may have induced (forced) Canada to undertake a new policy of domestic subsidization that, once in place, would be difficult to remove. Canada will be less likely in the future to adjust production because of changes in world prices.

The *European Community* did not materially alter its policies. There were modest reductions in guaranteed prices for 1987. The increased costs of the CAP, because of higher export restitutions (subsidies) and the falling U.S. dollar, precipitated a budget crisis in early 1988, which was solved more by expanding revenues than by capping farm expenditures. Production increases in the European Community may be slowed by limits on the eligibility for support payments and a modest set-aside program; but, clearly, the CAP prevented a downward adjustment in production. Thus the policy against which most of the rhetorical ire of the United States was directed responded the least.

The second round of response by the United States in 1987 to the above policy responses was to lower loan rates still further and to increase allocations to the Export Enhancement Program, making all countries such as the Soviet Union and China eligible. And so the action-reaction-response mechanism continued. At this point, Canada and Australia were confronted with direct, subsidized competition in traditional CPE markets.

Current Policy Interdependence and the Uruguay Round

Simultaneously, the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) negotiations is focusing on agricultural trade and has on the table many proposals – by the United States, Canada, and the Cairns Group – for substantial reductions in subsidies to agriculture and in barriers and/or subsidies to trade. The U.S. proposal is the most extreme, proposing complete elimination of subsidies over the next decade.

How, then, does one reconcile the short-run movements towards increased intervention, greater distortions, and higher subsidies that occurred in the aftermath of the implementation of the U.S. *Food Security Act* of 1985 with the apparent philosophical commitment to freer trade. The answer is not easy, but it will determine the course of agricultural trade, at least until the year 2000.

The current nature of domestic agricultural policy in developed countries has evolved over a long period, because agricultural interest groups with vested interests have used the political process to improve their welfare (to seek rents). Anderson and Hayami[3] argue that the power of agriculture to gain transfers will increase as it becomes a smaller and smaller part of the economy. This is consistent with Mancur Olson's[4] notions that small groups of producers are much more capable of defending their interests than, say, large groups of consumers. The notion of political markets (Rausser),[5] as applied to agriculture, is receiving increasing study. Following this line of political-economy analysis, it seems likely that as long as policy making – both domestic and international – is in the hands of agriculturalists, there will be no major changes. While most studies of trade liberalization show substantial national gains from the removal of agricultural protectionism, these gains result because consumer and Treasury savings more than offset producer losses. This is discussed in Chapter 5. Thus if the GATT negotiations are to succeed, trade policy, as it relates to agriculture, must be in the hands of policymakers who give greater consideration to national and consumer interests.

Currently, agricultural policy and related trade policy are in the hands of agricultural interests in most developed countries – particularly in the United States, Canada, Japan, and the European Community. To date, all historical evidence suggests that, if anything, they are more firmly in control, as attested to by developments in the 1980s in the United States, Canada, the European Community, and Japan, among others. Thus in the absence of external shocks, the best bet would seem to be to assume continuance along roughly the same course. This would portend little change in U.S. policy until 1991 (the expiration of the 1985 U.S. *Food Security Act*). It also suggests that to the extent that other countries' policies are reactive to U.S. policy, there will be little change there either.

But this status-quo model of a sophisticated, rent-seeking, political-interest group still begs the question: Is there no way out of the destructive spiral of competitive export subsidies and domestic support that currently plagues agricultural trade – which is on the verge of a trade war? In other words, are there external shocks that could break the long-established pattern? Four possibilities come to mind:

1 The most frequently heard argument is that increased fiscal costs will eventually force changes. The United States spent nine times as much on direct supports to agriculture in 1986 as it did in 1980. CAP expenditures have the European Community in a continuous budget crisis. Budgetary concerns are increasingly in the forefront of Canadian discussions, as costs escalate rapidly. Surely at some point the nonagricultural majority will say, "enough is enough." But the evidence to support this scenario is not strong. Pundits, including many academics, have been arguing for 10 years that increasing the cost of the CAP by lowering world prices would force policy change. It did, but not a change in the CAP; instead, it led to steadily seeking new and additional sources of funding for a basically unchanged CAP. Debate at the time of the 1981 Farm Bill in the United States (see Infanger et al., 1983)[6] insisted that budget control would shape future policy. It was argued that direct expenditures much in excess of the prevailing levels (about $5 billion) would not be tolerated. Yet the United States spent – directly and indirectly – 25 to $30 billion on PIK (payment in kind) in 1983 and $26 billion on direct support in 1985/86. Thus the budget cost factor has not yet forced significant changes in farm policy.

2 Another argument is that if overall economic performance becomes so sluggish that major overall economic reform is dictated, agricultural reform will be swept along with it; that is the so-called "New Zealand case." Yet, to date, the queue to follow New Zealand's experiment is extremely short, if it exists at all.

3 The next possibility is that increasing protectionism in agriculture could trigger a real trade war that would spill over into other sectors, threatening a liberal world-trading regime. Nonagricultural interests at the national level would then overpower agricultural interests and wrest control of the policy process from rent-seeking agricultural interests. That would allow a new hegemonic leader to emerge, to lead the world to liberalism, as the United Kingdom did before the First World War and as the United States did after the Second World War. Yet the two most likely prospects, in terms of economic power, are the European Community and Japan, both of which are decidedly illiberal in their trade policies, especially as they relate to agriculture. Yet it is the concerns of nonagricultural interests that may stand the best chance of forcing change.

4 Consumer interests may eventually discover the costs of protectionism and rise up against the entrenched agricultural interests. Some argue (McCalla, 1987)[7] that by selecting the most egregious policy – e.g., the sugar or dairy policy – small numbers of vested interests could be overcome and/or compensated handsomely for the appreciation of their accumulated assets. To date, however, attempts to divide agricultural interests have not been successful.

All of the above possibilities are based on the premise that things will get so bad that those who are paying the bill will rise up and overthrow the agricultural interests. There may be an alternative scenario. It may be that times of prosperity are the best times for policy reform. The world missed a golden opportunity in the 1970s – when domestic programs were nonoperative because of high prices – to dismantle farm programs. The United States tried, but it did not go far enough. The relative prosperity in wool and meat markets are probably restraining increased support to agriculture in Australia. The current interest in decoupling income transfers from agricultural production is much more likely to be enacted in periods of prosperity than during a recession. If, by chance, because of supply shortfalls (e.g., from a second bad monsoon in Asia), economic recovery in a number of nations were to lead to high prices like those of the 1970s and this were to occur before the end of the Uruguay Round, the prospects for agricultural trade liberalization might be greatly improved.

How things will turn out is not known, but it does seem that one prudent strategy would be to assume that there will be no radical changes in policy regimes in the near future. This would suggest policy approaches that seek incremental liberalization in preparation for a window of opportunity should it arise.

Implications for Prairie Agriculture and Canadian Policy Choice

The conclusions reached from the analysis in Chapter 2 and from this chapter are important and may have significant implications for Prairie agriculture. They also suggest possible policy options for Canada. The principal conclusions are as follows:

1 World agricultural markets, particularly grain markets, have experienced significant structural changes over the last three decades. The importance of a few developed-country exporters has remained, while less developed countries (LDCs) and centrally planned economies (CPEs) have become more important as importers. These trends are particularly pronounced in grains, especially wheat, and will likely continue.

2 The composition of the grain trade has shifted towards coarse grains and lower-quality wheat, both because of rising incomes in LDCs and CPEs and greatly expanded production in Europe. These trends are likely to continue.

3 Over time, Canada has relied much more on the CPEs as major grain buyers. Over 50 per cent of Canada's wheat in the late 1980s is going to those regions.

4 Price instability has been the hallmark of those markets in the 1970s and 1980s, in sharp contrast to the stability of the 1950s and 1960s. This instability is induced as much, if not more, by the policy actions of the major actors as it is by underlying economic factors.

5 The uncertainty that results from policy shifts is much more difficult to predict than that coming from basic economic variables such as prices, incomes, population, technical change, and land availability.

6 Future projections of levels of trade (see Chapter 5) in commodities of interest to Canada are highly variable, and they almost always neglect potential dynamic changes in policy. But, on balance, they are much more pessimistic about growth prospects, particularly for wheat, than earlier ones, which reflected the heady growth of the 1970s.

7 Policy interdependence among major actors has increased, resulting in significant impacts on one country's policy outcomes from policy choices in other countries. This leads to "beggar my neighbor" kind of responses, as each country seeks to export its instability and protect against having to bear adjustment costs for instability in world markets. The process of unilateral policy action/reaction leads to increased, not decreased, protectionism and contributes to a trade war mentality.

In sum, the world-market environment is dynamic, alternating between rapid growth and sharp declines in both price and volume. Its instability has increased, not so much from traditional causes such as weather, but because of policy shocks. It is therefore inherently uncertain and unpredictable. This is so, because national-policy interests still dominate in most, if not all, major-player countries. Policy-induced excess supplies are stored (until stocks become unbearable) or dumped in world markets. Market-share maintenance becomes an element of national pride, while failing to recognize that not all players can have growing market shares.

For Canada, that kind of environment poses particularly difficult problems, for several reasons. First, Canada is more dependent on world markets for its grain than any of its major competitors. Oleson (1987)[8] showed that the percentage of wheat and wheat-flour production exported (i.e., the average for1983/84 and 1985/86) was 79 per cent for Canada, compared with 75 per cent for Australia, 68 per cent for Argentina, 50 per cent for the United States, and 21 per cent for the EC-12. Therefore, world markets are crucial for Canada.

Second, production alternatives on the Prairies are more limited than they are for any of Canada's competitors. Australia, for example, was better able to adjust than Canada because of the possibility of shifting relatively easily to sheep and cattle production. Argentina, on the pampas, has alternatives – corn, soybeans, and beef. The U.S. alternatives are substantial, except for the northern plains; and European options are wide indeed. The dominance of wheat on the Prairies in Canada far exceeds single-commodity dominance in any other country.

Third, Canada has pursued a policy of producing high-quality, high-protein wheat for bread. This strategy has probably paid high dividends historically. But all evidence suggests the increases in demand for wheat in the growing markets of the LDCs and CPEs are much less quality-conscious, and the traditional European market has diminished. Growth has been even more rapid in the demand for feed wheat and feed grains. Thus the dual strategy in Canada of premium-pricing limited quantities of high-protein wheat and expanding production of higher-yielding, lower-quality wheats and feed grains – a strategy adopted in the late 1980s – seems to be justified.

Fourth, Canada's marketing strategy has consisted of being a reliable supplier of high-quality wheat to regular customers. In particular, bilateral agreements have been fostered. Underlying this strategy has been the seeking of at least a constant, if not rising, market share. The emergence of the European Community as a major exporter has clearly created a situation in which a major set of exporters is seeking market shares that may be fundamentally incompatible. If the United States, having experienced a 45-per-cent share in the late 1970s and early 1980s, seeks to regain that share; if Canada wants to keep a 20- to 25-per-cent share; and if the European Community's share continues to grow to 20 per cent, that leaves 10 per cent for Australia and Argentina, which is incompatible with their current share of 20 per cent. These inconsistent share targets may well be what triggered the most recent price war. Competitive price cutting, with a fixed-share target, in an inelastic short-run market, is self-defeating for all, in terms of revenue. Yet, not meeting price cuts could be disastrous for a country's share.

Finally, Canada has historically not subsidized grain production to nearly the same extent as the United States or the European Community. It has been more "market-oriented" – as much because of budget constraints as philosophical commitments. Compared with the United States and the European Community, Canada is a small country, with fewer alternatives in terms of production than other small-country exporters like Australia and Argentina. Canada has less fiscal capacity to endure a prolonged price war than its larger competitors. With some considerable justification, Canada feels caught in a situation, dictated by others, that it cannot unilaterally correct. In other words, there may be no action that Canada can take to turn the situation around, except perhaps to try to influence the policy choices of other nations.

Thus the first policy implication is clear. Cooperative or multilateral approaches are critical to Canada. That is already understood, as Canada has attempted, in difficult times, to encourage cooperation among exporters; however, Canada itself has been accused, at times, of not cooperating – for example, with the U.S.-Soviet embargo and PIK in 1983. It is also a member of the Cairns Group and a staunch supporter of the GATT. These approaches only work, however, if others are willing to cooperate. Therefore, the second policy implication is that Canada needs to have a well-developed strategy for self-preservation if multilateral approaches do not work. Such a strategy could incorporate multiple pricing (price discrimination between quality and volume markets); production diversification, particularly to increase the range of wheat qualities produced; and enterprise diversification. It could well involve a significant reduction in the production of high-quality wheat. That would have differential impacts on regions within the Prairies and would necessitate careful consideration of alternative rural-development strategies. The third policy implication is that all dimensions of Prairie agriculture should be considered potentially changeable – namely, policy goals, institutions, export strategies, policy regarding grading and variety, transportation policy, and basic notions about comparative advantage.

Possible Factors That Could Improve Global Prospects

The preceding discussion is based on the implicit premise that the current policy regimes of the major actors will stay in place, yields will continue to grow, and economic growth will be modest globally. In some ways it resembles a worst-case scenario. Yet it seems best, in thinking about long-range policy options, to think seriously about the implications of Murphy's Law: "If it can go wrong, it will." It also provides a baseline against which to compare more favourable possibilities.

Against such a case, consider possible developments in three areas – trade liberalization, technology, and global economic performance – that could significantly affect the outcome.

Trade Liberalization

Trade liberalization in developed countries would result in rising world prices and expanded demand if, indeed, trade liberalization could be achieved. The possibilities of this are discussed later. It could benefit Canada if producer prices rose sufficiently to offset current deficiency-payment transfers. But it is not clear whether it would benefit producers in the United States, the European Community, and Japan. If liberalization in grains occurred in developing countries as well, that would raise their domestic prices, expand production, contract their domestic demand, and reduce import demand, all of which would put downward pressure on world prices. While there is no question that trade liberalization in agriculture would benefit most countries, on balance, it is by no means certain that producers in every country would benefit. That may explain why most producer groups in the United States, including organizations such as the National Association of Wheat Growers, are skeptical of the U.S. proposal in the Uruguay Round.

Technological Change

Productivity improvements in grains have kept slightly ahead of population growth on a global basis since the Second World War, resulting in modest increases in food supply per capita. The performance, however, has not been uniform between regions within countries, between countries and continents, or between commodities. Progress in rice and wheat has been substantial in certain areas, mainly in Asia. What of the future? A slowdown in productivity growth would have negative implications for poor people in developing countries but would tend to expand trade. That would only be true in the short run, however, since decreases in productivity growth would eventually lead to slower economic growth and a lower capacity to import. A more rapid rate of productivity increase could reduce trade prospects in the short run (as in China, for example, over the last 10 years) but be expansive in the long run as improved agricultural incomes fueled economic growth (as in Korea and Taiwan in the 1970s). Either way, global productivity changes could have significant short- and long-term impacts.

Global Economic Growth

The explosion in demand for food – and particularly feed – grains in the 1970s was driven by rapid economic growth in the so-called newly industrialized developing countries (NICs), where annual GNP growth of 6 to 10 per cent triggered an increased demand for meat that far outstripped the domestic production capacity of feedstuffs. Such was the case in Taiwan, South Korea, Hong Kong, and Singapore, where exports led growth, and it occurred under favourable macroeconomic conditions. It has been slowed down around the world by the decline in growth rates in the 1980s. If, for example, the United States got its fiscal deficit (and resulting trade deficit) under control, real interest rates would fall, and it is hoped that exchange rates would stabilize. That would improve the chances of solving the debt crisis and would stop the United States from soaking up global savings to finance a large trade deficit; this, in turn, could have a significant impact on global demand.

World agricultural markets are finely balanced and, at times, on a knife's edge; as a result, small supply or demand shifts cause large price swings. Thus favourable progress in one or more of those broad areas could significantly buoy markets. Should that occur and should there be a significant supply shortfall, the world grain market could look like that of the 1970s all over again.

This last point is the upside scenario in contrast to the downside, on which perhaps too much of the discussion has focused. Both are possible. The one thing that can be said for sure about the implications of global developments for Prairie agriculture is that they are uncertain. The implication of this is that future plans should be flexible and should contain options. Two additional policy implications are that government policies should seek to foster favourable global economic developments and also contain the will and the capacity to help Prairie agriculture adjust if things do not turn out so well.

4 Global Agricultural Intervention

Because of increased agricultural protectionism around the globe and the heightened use of export subsidies, the future of agriculture on the Prairies depends largely on the degree to which trade liberalization and expanded trade may occur. As shown below, the degree of protectionism is large, as are the export subsidies that are currently in place.

Agricultural trade barriers are expected to be given high priority under the Uruguay Round of multilateral GATT negotiations. For the first time, members of the GATT have agreed to negotiate on agricultural policies and programs that inhibit trade in agricultural products (Hathaway).[1] The United States has proposed that GATT negotiations work towards the elimination of all agricultural subsidies. A number of countries, including Canada, have supported that proposal. The expectation is that if it is implemented, it will rectify the problems of low prices, surplus production, and export dumping. Japan and the European Community did not lend support to the U.S. position. The Japanese and European Community position is not very encouraging for Canada's Prairie farmers, since the European Community's Common Agricultural Policy and Japan's import barriers are the two greatest obstacles to freer agricultural trade. The European Community has, instead, called for a form of exporter cooperation in the international food markets. This would involve a market-sharing agreement that would presumably guarantee the European Community market access and, at the same time, enhance world prices. The European Community and Japan fear that the elimination of subsidies would result in a decline in their domestic self-sufficiency ratios.

The U.S. proposal to eliminate all subsidies was a bold political move; in practice, however, it would be difficult to carry out. The U.S. politicians did not clearly spell out a workable method by which to reduce global agricultural subsidies. So far they have only proposed that it be done; they have not prepared an agenda on how to do it. The first major problem in carrying out this proposal would be in identifying and measuring the trade-distorting subsidies. The second problem would be in developing a formula for reducing subsidies in a multilateral fashion.

The purpose of this chapter is to discuss briefly the distortions in the major grain markets. Next, the alternative approaches used to measure subsidies and trade barriers are outlined. The following chapter discusses the implications of removing those subsidies.

A Taxonomy on Intervention

The fixing of producer and consumer prices within countries has a direct impact on international grain markets. The type and seriousness of the impact depend on where prices are set relative to world levels. Figure 4-1 outlines four common pricing arrangements found in countries around the world. These pricing arrangements are shown in the left-hand column. The impact of the arrangement on the global market depends on whether the country in question is an importer or an exporter. Reading across the first row of Figure 4-1, consider what happens when a grain exporter sets both the producer price (P_p) and the consumer price (P_c) above world levels (Case 1). This is the situation in the European Community for wheat. This pricing policy encourages production and exports, and thus raises the volume of international trade (T_v↑). The rising volume leads to lower world prices (W_p↓).

Japan has a similar policy in place for wheat (P_p, P_c above W_p), but since it is an importing country, this policy has an opposite effect on trade volume (T_v). Since the high wheat price discourages domestic consumption and encourages domestic production, the level of imports is reduced, and world prices fall.

Case 2 represents a situation where the producer price is set above world prices (P_p above W_p), and consumer prices are set approximately equal to world prices (P_c equals W_p). The U.S. wheat program and the Japanese soybean program fall into this category. Flour millers in the United States can purchase wheat at prices below those received by farmers. The same is true for soybean crushers in Japan. The high price paid to U.S. wheat farmers encourages production, and this leads to a higher trade volume and lower world price. In Japan, this policy encourages domestic production, which lowers import volume and world prices.

Case 3 is a situation where the producer price is set at approximately world level, and consumers are subsidized

Figure 4-1

Four Producer and Consumer Price Arrangements and the Impact on International Markets, by Commodity and by Country

	Rise or fail of world prices and of trade volume, by	
	Grain exporter	Grain importer
Domestic price-level arrangement:		
	(EC wheat)	(Japan wheat)
Case 1 P_p above W_p P_c above W_p	$W_p\downarrow$ $T_v\uparrow$	$W_p\downarrow$ $T_v\downarrow$
	(U.S. wheat)	(Japan soybeans)
Case 2 P_p above W_p P_c equals W_p	$W_p\downarrow$ $T_v\uparrow$	$W_p\downarrow$ $T_v\downarrow$
	(Brazil soybeans)	(India wheat)
Case 3 P_p equals W_p P_c below W_p	$W_p\uparrow$ $T_v\downarrow$	$W_p\uparrow$ $T_v\uparrow$
	(Argentina wheat and Thailand rice until 1987)	(Egypt wheat)
Case 4 P_p below W_p P_c below W_p	$W_p\uparrow$ $T_v\downarrow$	$W_p\uparrow$ $T_v\uparrow$

P_p = Producer price
P_c = Consumer price
W_p = World price
T_v = Trade volume

(i.e., P_c is set below W_p). Brazil has this type of pricing policy for soybeans that are exported. The Brazilian policy of subsidizing domestic consumers lowers exports (trade volume) and therefore raises world prices. Currently India has a similar policy for wheat; but since it is an importer, the consumer subsidy leads to a higher level of domestic demand, and thus imports (trade volume) and world prices are increased.

Case 4 represents a country in which both producer and consumer prices are set below world levels. Until 1987, Argentina and Thailand did that for both wheat and rice. Egypt is a major wheat importer, and it also has this type of policy in place for wheat. Such a policy approach raises world prices and leads to a higher trade volume for exporters and to a lower trade volume for importers.

The majority of the developed countries have pricing policies that are similar to either Case 1 or Case 2. As shown in Figure 4-1, these policies lead to lower world prices regardless of whether the developed country is an exporter or an importer. The net impact of these policies on trade volumes is ambiguous, because the importer's policies reduce trade volumes but the exporter's policies increase trade volumes. The upshot of this situation means that liberalization in the developed world should lead to higher grain prices. Trade volumes may increase, decrease, or remain unchanged.

The developing countries enact pricing policies that are similar to either Case 3 or Case 4 in Figure 4-1, and these lead to increased world prices. Trade liberalization in the developing part of the world should therefore lead to lower prices ($W_p\downarrow$). As is the case for the developed countries, the net effect on trade volume from developing-country liberalization is indeterminate.

Distortions in Major Markets

As pointed out earlier, in the rich countries of the world, farmers are paid prices for their grain that are higher than world prices, so they expand production beyond market-clearing levels. In the poor countries, they are paid low prices, which reduces production and expands consumption. If all subsidies and protectionism were removed, consumers and taxpayers would be better off in the rich countries, and producers would be better off in the poor countries.

This chapter focuses on the trade-distorting policies of the developed "rich" countries. It is generally true that the rich-country policies have the central goal of raising farm incomes. Their policies are extremely complex, and political rent-seeking by farm and agribusiness lobby groups influences policies. The cost to consumers is high, and it would be much cheaper to provide farmers with direct income transfers. What follows is a short description of the trade-distorting policies that exist in the United States, the European Community, Japan, and Canada.

United States

The primary feature of U.S. grain policy is a combination of government-guaranteed farm prices and government stock-holding activities. The U.S. government interferes less with market prices than the European Community. When world supplies are "tight" and prices are high, farmers in the United States get little in the way of government support; however, when global supplies are burdensome and prices are low, farmers must reduce acreage in return for guaranteed high prices.

The U.S. policy consists of several elements: target prices are guaranteed to producers who agree to "set aside" a specified amount of acreage; and loans are extended at a "loan rate" that establishes a crop as collateral. At time of maturity, the farmer can either pay back the loan or default – which, in effect, makes the loan rate a guaranteed minimum price. If market prices are below the target price, deficiency payments are made, equal to the difference between the target price and the higher of either the loan rate or the average price for the first five months of the marketing year. In addition to the loan rates and target prices, U.S. policy provides export subsidies under the Export Enhancement Program (EEP).

The 1985 Farm Bill (the U.S. *Food Security Act*) was in operation for the 1986 and 1987 crops. The first two years of the program cost the government around $26 billion per year, primarily because it lowered loan rates from the 1981 levels but maintained target prices, which raised deficiency-payment costs. For 1988, the target price for wheat is $4.23/bushel, and the loan rate is $2.21/bushel. To qualify for program benefits, farmers must set aside 27.5 per cent of their wheat-base acreage. The maximum deficiency payment is $2.02/bushel.

The U.S. policy has had some fairly clear impacts on world markets. The lower loan rates, combined with the EEP, have served to lower world prices dramatically. The high target price encourages production, but then farmers must set aside acreage in order to qualify. These two effects may offset one another, and thus the impact of the program on overall production would be neutral. The EEP has led to higher exports and thus to a greater market share for the United States.

The EEP has also been called the "Bonus Incentive Commodities Export Program" (BICEP). The funding allotted for this program was 1.5 billion dollars' worth of government stocks. The U.S. Department of Agriculture has announced that the program will be extended, with additional funding to be provided once the $1.5 billion runs out. The program was announced in May 1985 and is to run through September 1988. Under the EEP, commodities, which sell in the form of a bonus, are given to exporting firms from commercial sources in the United States. Originally, the subsidy program was directed towards EC customers only. The subsidized offers have since expanded to many other countries other than EC customers. For example, the subsidized grain sales to China have harmed the Canadian and Australian farmer much more than the European farmer. In 1987, under the EEP, China was sold 4 million tons and the Soviet Union, close to 9 million tons. These are two of Canada's largest customers; thus the EEP has had a dramatic impact on Prairie agriculture.

The quantity of wheat and barley exports from the United States increased significantly in 1987. As of February 1, 1988, roughly 30 million tons of wheat and 4.9 million tons of barley were sold under the Export Enhancement Program. For fiscal year 1987, 50 per cent of all U.S. wheat exports were EEP sales; however, the lower prices in 1986 and 1987 more than offset the increased volume of exports, resulting in a decline in the overall value of grain exports. During the first half of 1987, the EEP was used extensively; consequently, the per-unit value of U.S. grain exports fell by 25 per cent, according to the USDA, *Agricultural Outlook*, July 1987. The total value of grain shipments in fiscal year 1987 (October 1986 to September 1987) was below the 1986 level by about $346 million, even though export volume was up by over 16 million tons (see USDA, *Agricultural Outlook*, April 1988).

There are several arguments surrounding the effectiveness of programs like the EEP. As Appendix B shows, the U.S. Export Enhancement Program can be costly to the U.S. Treasury and is not necessarily needed to expand exports. In addition, even if exports expand in physical terms, the total value of export sales may fall. The major beneficiaries of these programs are the importers and the grain companies. As Appendix C shows, the use of export subsidies reduces a nation's overall economic well-being and certainly runs counter to the spirit of GATT.

European Community

The European Community is the second largest agricultural exporter, next to the United States. Its Common Agricultural Policy (CAP) is designed to shield its farmers from world competition. In the European Community, farmers are paid prices that are well above the world levels. There is, as yet, only a limited set-aside provision in place in the European Community, unlike that in the United States. Implementation of an effective set-aside program in the European Community is made difficult by the small size of its farms (approximately 40 acres, on average). Budget outlays for CAP are projected to exceed $33 billion in 1988, and the cost of CAP to the consumer is about twice the budgetary outlay.

The basic EC price is a target price (desired price) for farmers. To maintain that price, the European Community uses variable import levies for many commodities. There is a minimum price at which grains can be imported into the European Community – the "threshold price." The import levies are then calculated as the difference between the Rotterdam (c.i.f.) price and the "threshold price." These levies make the internal EC prices much higher than world prices. The CAP guarantees EC farmers those high prices by buying surplus production when the price falls below some predetermined level (the "intervention price"). The variable levies provide protection against imports. For commodities, where the European Community is an exporter, surplus production is exported through the use of export restitutions (subsidies).

As a result of the CAP and technological change, the European Community doubled its wheat production from 37 mmt in 1968/69 to over 70 mmt at present. The European Community became a net exporter of total grains in 1980 for the first time ever. The impact of the CAP on world markets has been negative for Canada. First of all, the European Community went from a major grain importer to a major exporter. Second, the European Community pays farmers high prices and imposes only limited production quotas. As a consequence, production is increased, and the surplus is "dumped" on world markets.

Japan

Japanese agricultural policy is discussed in detail in Chapter 6. In 1986, direct government subsidies in Japan amounted to $15 billion, compared with $23 billion in the European Community and $25 billion in the United States that year. As shown in Chapter 5, the cost of Japan's farm policy is not as significant for the taxpayer as for the consumer. The important point about Japanese policy is that it does not disrupt world markets by exporting food, but its import barriers restrict imports that would take place in the absence of distortions.

Japan controls imports through quotas. These quotas are most restrictive for beef, wheat, and citrus fruit. Rice imports into Japan are strictly prohibited. Japan has a surplus amount of rice production as the result of paying its farmers about five times the world price.

The import restrictions in Japan tend to depress both world prices and the volume of trade. The way in which the Japanese government manages food imports enables it to discriminate between suppliers, and that runs counter to GATT's most fundamental tenet of non-discrimination.

Canada

The Canadian government has been spending from C$3.5 to C$4 billion per year on agriculture over the past few years. A large percentage of this is in the form of direct transfer payments. Stabilization programs are a very pervasive aspect of Canadian farm policy. Generally speaking, price stabilization is provided for several commodities that are used domestically, while income stabilization is provided for a number of goods that are exported. The major federal programs are those under the *Agricultural Stabilization Act* and the *Western Grain Stabilization Act* (WGSA). In addition, a C$1-billion Special Grains Program (SGP) was announced in late 1986. The payment for each crop was inversely related to the relative price decline attributable to the global trade war. This SGP was extended in 1987 with another C$1.1 billion, plus an infusion into the WGSA of about C$700 million. A recent development in Canadian policy that is important for international trade was the passage of the *Western Grain Transportation Act* (WGTA) in 1983. It provides for an annual contribution by the federal government of C$658.6 million and for higher freight payments to the railways by farmers.

Canadian grain policy has encouraged exports through the relatively large freight-rate subsidies. This has served to depress world prices. In the past few years, production has been maintained in Canada partly because of the generous government payments. Except for the Lower Inventories for Tomorrow (LIFT) program, Canadian policy has not paid farmers not to produce grain. In this regard, Canadian policy has, at times, worked against U.S. policies.

Producer-Subsidy Equivalents (PSEs)

A popular way in which subsidy levels can be represented is in the form of producer-subsidy equivalents (PSEs). A PSE is the subsidy required to compensate producers for the removal of all government programs. The PSEs have been calculated on a commodity-by-commodity basis in a number of different studies. A PSE is simply the percentage of the total value of production accounted for by government income transfers to farmers. It may also include the transfer effect of policies that do not provide cash transfers.[2] For example, if the PSE measure is 25 per cent, this implies that one-fourth of the farmer's return for the commodity is due to government subsidies. Clearly, the PSE estimates are not ideal measures of the rate of protection; but that does not detract from their usefulness as indicators of economic transfers in agriculture. A basic problem with PSEs is that there are subsidies in existence that have no trade-distorting features. Alternatively, there are "hidden" subsidies that are definitely trade-distorting.

Accounting for subsidies that are only trade-distorting is a difficult problem. McClatchy and de Gorter,[3] the USDA,[4] and Tangermann, Josling, and Pearson[5] have all pointed out the strengths and weaknesses of PSEs as measures of trade distortions. McClatchy and de Gorter suggest that the use of large-scale econometric models would provide a better approach to studying the rates of agricultural trade protectionism because of the importance of cross-commodity linkages. The OECD[6] has attempted to combine their PSE figures with a large econometric model of world agricultural trade. The U.S. Department of Agriculture and Tangermann et al. point out that PSE measures are not all that dependable, since changes in PSEs over time can be due to such things as changes in country policies, world prices, or exchange rates. In addition, they demonstrate that the inclusion of supply-control policies (e.g., by the Canadian marketing boards for chickens, eggs, and turkey) will lead to an "upward-biased" PSE if it is calculated in the traditional way. These supply-control policies may create an inefficient use of domestic resources, but their international impact is minimal. Since the PSE is the ratio of transfers to the total value of production, the denominator will be biased downward in the case of supply-control programs. As a consequence, the PSE calculation will be upward-biased; however, if this problem is recognized, the PSE measure can be adjusted to reflect more accurately the trade-distorting impact of supply-control policies.

The OECD has estimated PSEs for five major commodities in the following countries: Australia, Canada, the European Community, Japan, and the United States. A six-year period was covered from 1979/80 to 1984/85. Their results are shown in Table 4-1. The OECD data indicate that Japan and the European Community have the highest level of subsidies, and Australia tends to have the lowest. Milk and sugar receive the highest level of support across the five countries examined. There is obviously a good deal of variation in the PSEs from year to year and from commodity to commodity.

In a comprehensive study, the U.S. Department of Agriculture estimated PSEs for a large number of countries but over a very short time period. Sixteen different countries were covered over a three-year period (1982-84). The USDA results are displayed in Figure 4-2. This figure shows that Japan, the European Community, Taiwan, South Korea, and the United States provide the highest level of subsidization to their producers. According to these calculations, Australia, Canada, and the European Community provided less assistance to wheat producers than did the United States over the 1982-84 time period. Canada provided the most support to its dairy and sugar producers.

A longer time series for Canadian and U.S. grain-producer subsidies was examined by Carter and Glenn.[7] Their results for wheat are shown in Chart 4-1 for Canada and the United States. They found that wheat farmers in Canada receive a much more stable level of support than their counterparts in the United States. The 15-year average proportional subsidy for wheat producers in the United States was estimated to be 15.5 per cent, compared with 13.4 per cent in Canada. This indicates that wheat farmers in Canada did not receive quite as much support as those in the United States, but the difference was only about 2 per cent of the value of production. These results are quite different from the OECD and the USDA results. The OECD wheat PSEs averaged 17 and 12.5 per cent for Canada and the United States, respectively; the USDA estimates were 10 to 24 per cent for Canada and 25 to 49 per cent for the United States. These discrepancies serve to illustrate the sensitivity of the PSE calculations to the time period chosen. That is a serious weakness of the PSE measures.

Since the time periods for which the above calculations were made, the subsidy levels have increased in both Canada and the United States. For 1986 and 1987, the wheat PSEs in both countries were over 50 per cent. It is not only the subsidy levels that are important but also the impetus for those transfers. For example, while the recent wheat-subsidy levels in Canada may be as high as those in the United States, the cash transfers under the Special Grains Program occurred in reaction to the U.S. policy enacted in 1985. The earlier discussion of policy interdependence must be kept firmly in mind in the subsidy debate.

Alternative Measures

An alternative measure of the extent to which farmers are either subsidized or taxed has been used by the World Bank.[8] This is the ratio of farm-gate prices to border prices, which is defined as "the nominal protection coefficient"

Table 4-1

Transfers to Farmers under Price-Support and Related Programs as a Proportion of Receipts from Sales: Selected Commodities and Countries, Crop Years 1979/80 to 1984/85[1]

	Transfers as a proportion of receipts					
	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85
			(Per cent)			
Milk						
Australia	19.1	12.3	8.0	13.0	25.5	33.0
Canada	28.0	17.5	9.5	19.5	37.5	37.9
European Community	89.0	79.7	68.5	54.9	63.0	62.0
Japan	23.9	18.8	16.1	16.9	22.0	23.1
United States	20.8	8.9	–1.6	2.7	17.7	21.2
Sugar						
Australia	–5.3	–9.1	–0.7	9.8	6.5	12.3
Canada	4.8	3.7	22.6	32.5	20.2	– –
European Community	64.7	–7.4	80.0	123.7	134.7	142.1
Japan	46.2	58.3	78.4	78.9	84.6	84.1
United States	14.7	3.6	35.6	117.2	124.9	139.6
Wheat						
Australia	–4.0	2.8	5.4	11.8	5.7	2.8
Canada	11.8	12.5	12.8	16.7	18.6	29.2
European Community	50.4	41.8	46.4	58.5	44.9	37.6
Japan	77.9	75.8	77.7	77.9	77.7	79.9
United States	1.2	3.3	7.7	7.8	38.0	17.2
Rice						
European Community	24.9	0.4	21.9	43.9	32.5	27.0
Japan	78.1	71.2	73.0	76.4	75.6	79.4
United States	0.1	0.1	1.4	23.6	81.0	35.7
Maize						
European Community	54.7	38.4	48.9	48.8	26.3	22.1
United States	1.7	1.0	2.2	4.2	51.7	7.6

[1] Producer-subsidy equivalents comprise all transfers to farmers effected through trade measures and domestic support programs as a proportion of receipts from sales of the respective commodity. Negative figures indicate proportional reduction in farm receipts because of programs. This occurs usually at times of high world market prices and is implemented by export restrictions or import subsidies.

SOURCE Organisation for Economic Co-operation and Development.

(NPC). This measure leaves out the many "hidden" subsidies that would be captured by the PSEs and is therefore not as useful as a measure of protection. The World Bank calculated NPCs for several developing countries. A large number of commodities are actually "taxed" in the developing world rather than being subsidized, as is the case in the developed world. For the period studied by the World Bank (the late 1970s and early 1980s), wheat production was heavily subsidized in Korea and, at the same time, heavily taxed in Argentina. The tax on export commodities was particularly high. This is ironical, since the availability of food per capita is very low in most of those countries; yet they discourage production through implicit taxes. On the other hand, there is no shortage of food in the developed world; yet surplus production is encouraged through artificially high prices and subsidies. Table 4-2 reports the World Bank's NPC estimates for the developed world; these were calculated from data for the

Figure 4-2

Ranking of Producer-Subsidy Equivalent (PSE) Levels, by Commodity and by Country, 1982-84

	United States	Australia	Canada	New Zealand	European Community	Japan
Ratio:[1]						
Producer tax						
–0.01 to –0.09		Pork* Poultry*				Citrus fruit
Producer subsidy						
0 to 0.09	Soybeans* Pork Poultry* Beef	Wheat* Barley* Beef* Sheep meat* Wool* Cotton*	Corn Oats* Soybeans Beef Pork*	Wheat Barley*	Corn	
0.10 to 0.24	Barley*	Rice* Cane sugar*	Wheat* Rapeseed* Flaxseed* Poultry Barley* Rye*	Beef* Manufactured milk*	Common wheat* Pork*	Poultry
0.25 to 0.49	Sorghum* Corn* Wheat* Dairy products Cotton*	Fluid milk Manufactured milk*	Sugar	Sheep meat* Fluid milk Wool*	Durum wheat* Dairy products* Sheep meat Rapeseed Soybeans Barley* Rice Poultry*	Pork
0.50 to 0.74	Sugar Rice*		Dairy products*		Sugar* Beef*	Beef Soybeans
0.75 to 0.99						Fluid milk Manufactured milk Rice
1.00 or more						Wheat Barley

	Taiwan[2]	South Korea[2]	India	Argentina	Nigeria	Mexico[2]	Brazil
Producer tax							
More than –0.50					Cocoa*		
–0.26 to –0.49			Wheat Cotton (LS)*				

Figure 4-2 (concl.)

	Taiwan[2]	South Korea[2]	India	Argentina	Nigeria	Mexico[2]	Brazil
Producer tax							
–0.10 to –0.25			Rice Cotton (MS)* Peanut meal	Wheat* Corn* Sorghum* Soybeans*			
–0.01 to –0.09			Rapeseed meal Soybeans Soymeal	Soymeal* Soyoil*	Rice Cotton		Soybeans* Manufactured milk
Producer subsidy							
0 to 0.09	Pork*				Corn		Beef*
0.10 to 0.24	Corn Soybeans Sugar*	Poultry	Rapeseed Peanuts*			Cotton* Sorghum Wheat	Poultry*
0.25 to 0.49	Rice* Beef Poultry Dairy products Tobacco	Pork	Soyoil Peanut oil		Wheat	Soybeans Corn	Cotton*
0.50 to 0.74	Wheat Sorghum Barley	Rice Wheat Corn Barley Soybeans Beef	Rapeseed oil				
0.75 to 0.99		Fluid milk					
1.00 or more					Sugar		Wheat

* Net exporter during 1982-84. LS: long stable; MS: medium stable.

1 Ratio of policy transfers to gross domestic value of production, including direct payments.

2 Impacts of input subsidies not included.

SOURCE U.S. Department of Agriculture, "Government intervention in agriculture: Measurement, evaluation, and implications for trade negotiations," ERS Staff Report AGES861216, January 1987.

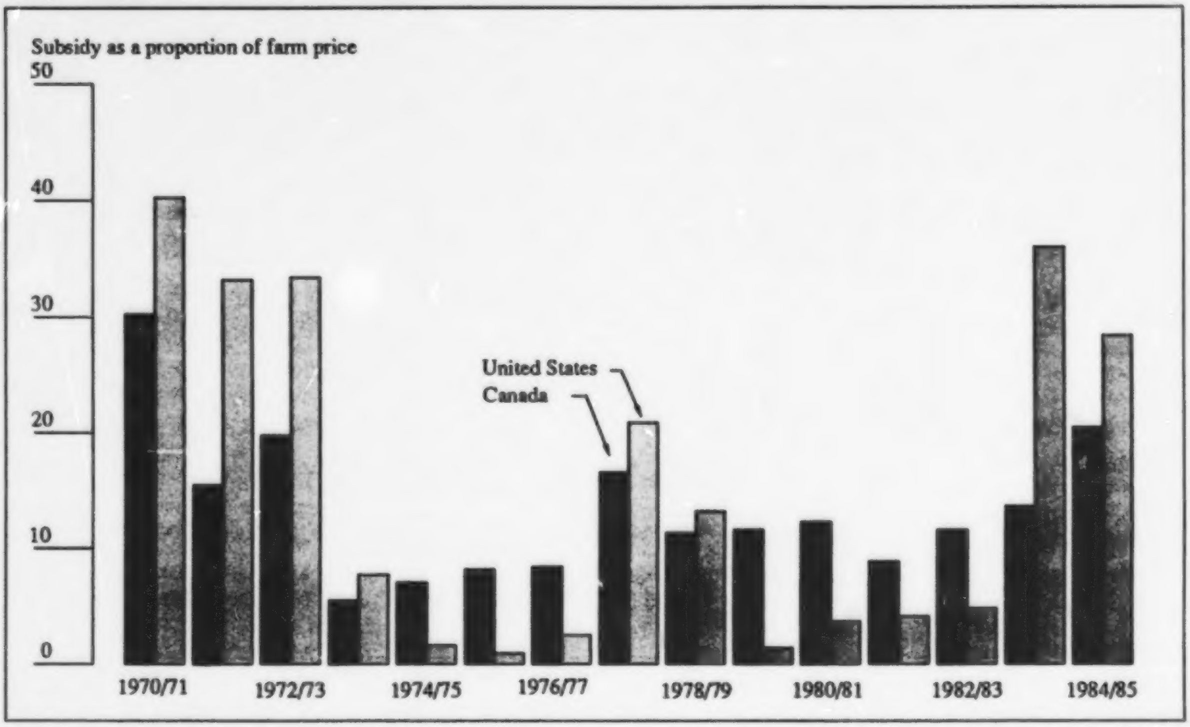
1980-82 period, according to which the Japanese and European farmers receive the highest level of support. Of the commodities studied by the World Bank, dairy products, rice, and sugar receive the most protection; that is consistent with the results obtained by the OECD study, which used the PSE measure.

As far as alternative measures go, the Australian government would prefer to use a tariff-equivalent measure to assess trade distortions. They have suggested using an effective-rate-of-protection measure. This measures the protection afforded "value added," and it is often reported as a tariff equivalent. This type of "yardstick" has been used by GATT in its negotiations to downsize trade barriers in manufactured products. A tariff-equivalent measure of that sort would be more dependable than a PSE.

Upon doing a cross-examination of countries, then, one finds a complicated array of producer and consumer price levels. As the following chapter demonstrates, that means

Chart 4-1

Wheat Subsidy as a Proportion of Farm Price, Canada and the United States, Crop Years 1970/71 to 1984/85



SOURCE C. Carter and M. Glenn, "Government transfers to North American grain producers: Levels and implications," *Agribusiness* 4, no. 3 (1988).

that trade liberalization will benefit producers in some countries (e.g., in several LDCs) and harm producers in others (e.g., in several DCs); consumers, on the other hand, will generally be harmed in LDCs and CPEs, but they will gain in many of the DCs (e.g., in Japan and the European Community).

Table 4-2

Nominal Protection Coefficients (NPCs) for Producer and Consumer Prices of Selected Commodities, Industrial Countries, 1980-82

	Wheat		Coarse grains		Rice		Beef and lamb	
	Producer NPC	Consumer NPC	Producer NPC	Consumer NPC	Producer NPC	Consumer NPC	Producer NPC	Consumer NPC
Country or region:								
Australia	1.04	1.08	1.00	1.00	1.15	1.75	1.00	1.00
Canada	1.15	1.12	1.00	1.00	1.00	1.00	1.00	1.00
European Community[1]	1.25	1.30	1.40	1.40	1.40	1.40	1.90	1.90
Other European countries[2]	1.70	1.70	1.45	1.45	1.00	1.00	2.10	2.10
Japan	3.80	1.25	4.30	1.30	3.30	2.90	4.00	4.00
New Zealand	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
United States	1.15	1.00	1.00	1.00	1.30	1.00	1.00	1.00
Weighted average[3]	1.19	1.20	1.11	1.16	2.49	2.42	1.47	1.51

	Pork and poultry		Dairy products		Sugar		Weighted average	
	Producer NPC	Consumer NPC	Producer NPC	Consumer NPC	Producer NPC	Consumer NPC	Producer NPC	Consumer NPC
Country or region:								
Australia	1.00	1.00	1.30	1.40	1.00	1.40	1.04	1.09
Canada	1.10	1.10	1.95	1.95	1.30	1.30	1.17	1.16
European Community[1]	1.25	1.25	1.75	1.80	1.50	1.70	1.54	1.56
Other European countries[2]	1.35	1.35	2.40	2.40	1.80	1.80	1.84	1.81
Japan	1.50	1.50	2.90	2.90	3.00	2.60	2.44	2.08
New Zealand	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
United States	1.00	1.00	2.00	2.00	1.40	1.40	1.16	1.17
Weighted average[3]	1.17	1.17	1.88	1.93	1.49	1.68	1.40	1.43

[1] Excluding Greece, Portugal, and Spain.

[2] Austria, Finland, Norway, Sweden, and Switzerland.

[3] Averages are weighted by the values of production and consumption at border prices.

SOURCE World Bank, *World Development Report, 1986* (Washington: The World Bank, 1986).

5 Future Prospects: With and Without Liberalization

The eighth round of GATT negotiations (the Uruguay Round) is now under way. No one knows for sure what the outcome will be; thus this chapter reviews a sampling of projections of the future, with and without liberalization.

Projections of Future Prospects without Liberalization

It is almost a truism to assert that most projections, either qualitative or quantitative, are highly influenced by our most recent experiences. Since the Second World War pundits have predicted both critical global shortages and perpetual gluts. For example, two bad monsoons in Asia in the mid-1960s led to a spate of dire predictions for the future (see, for example, Paddock and Paddock).[1] A confluence of events – physical, economic, and policy-oriented – in the early 1970s triggered rising prices and concerns about future food supplies – e.g., the World Food Conference in 1974. Most predictions made in the late 1950s and mid-1980s, for example, predicted gluts and low prices.

These swings between optimism and pessimism are the result of many factors, including the conceptual framework used for projections; the time frame of analysis; the data used; the assumptions used about exogenous variables, such as population, income growth, and improvements in productivity; and the statistical or qualitative methodology adopted. For example, most long-term projections conclude that at some point in the future there will be a "food gap." This results from the compound effect of exponential growth rates in population and nominal income, as opposed to assumptions about limits to land expansion and the linear and slow growth rates in productivity (yields). These are the classical Malthusian models. But these types of models (e.g., the GOL, Iowa State, Global 2000) are generally devoid of price and policy content – two critical economic equilibrators of supply and demand. Furthermore, statistical and econometric projections rely on time-series data, which over the last decade and a half have been highly variable. Thus one can "adjust" the influence of, for example, the 1970s, depending on how far back one goes into preceding decades. Or if recursive simulation models are used, the recent experiences of the 1980s are more influential. Results also differ depending on whether the study is pursued on a global aggregate basis or by aggregating from country and regional analysis.

Despite these inherent difficulties with projections, there is no shortage of authors who engage in them. This section comments briefly on a few of them. Table 5-1 presents an incomplete sampling of recent studies that have projected actual levels of trade in wheat and/or coarse grains, and/or all grains. Most of them use 1980 as their base year. Scanning the table reveals a wide range of projected levels of trade. For wheat, the projected trade in 1990 ranges from 86 to 113 mmt; for all grains, from 235 to 440 mmt. For the year 2000, the International Wheat Council (IWC), the Michigan State University (MSU), the Australian Department of Trade Resources (ADTR), Cole and Horton, and Shane models project substantial increases in trade. The extreme projection by Shane of 160 mmt for wheat is nearly double the current trade; that by the International Institute for Applied Systems Analysis (IIASA) for all grains is more than 60 per cent higher than the current trade. The projections by the Food and Agricultural Policy Research Institute (FAPRI) use a more recent base and project much lower levels of trade through 1996/97 – the end of their projection period.

Actual trade levels based on the most recent statistics are compared with those of 1980/81 in Table 5-2. The actual trade in all categories has declined rather than increased. This is not the place to evaluate the validity of any or all of the projections. In fact, a set of projections is presented by Furtan et al. in another volume of the Economic Council of Canada's study of the Prairie grain industry. The purpose of this chapter is to suggest that there is a wide variance in estimates, depending on the methodology used and the base year. In general, those based on global trends project substantial increases in trade volumes. That, of course, is the Malthusian calculus at work. Those which analyse countries and regions and then aggregate to the global level are both pessimistic (EIU) and optimistic (IIASA). Perhaps the most thorough analysis, in an institutional sense, however, is the study by Woodhams for the Economist Intelligence Unit.[2] This study projects a decline in wheat trade by 1991, which is certainly in keeping with trends in the 1980s, as opposed to those in the 1970s on which most other studies are based. The Woodhams study and another by Butler[3] identify specific regions as critical to outcomes in the future.

Table 5-1

Projections of Trade in Wheat, Coarse Grains, and All Grains to Years 1990 and 2000, Using Selected Models

	Year study was published	Type of study[1]	Base year	Base-year projection			Projection to 1990			Projection to 2000		
				Wheat	Coarse grains	All grains	Wheat	Coarse grains	All grains	Wheat	Coarse grains	All grains
							(Millions of metric tons [mmt])					
Model:[2]												
IWC	1983	Global trend	1980	94	103	209	--	--	--	114	137	265
ADTR	1982	Global trend	1980	--	--	209	--	--	345	--	--	--
MSU	1982	Global trend	1980	71	89	160	100	135	235	--	--	--
Cole and Horton	1985	Global trend	1979-81	--	--	218	--	--	440	--	--	--
IIASA	1986	Aggregated	1980	78	83	169	113	113	249	140	172	328
EIU	1986	Aggregated	1980	92	--	--	86.5[3]	--	--	--	--	--
Shane	1987	Global	1981-83	87	--	--	--	--	--	160	--	--
FAPRI	1988	Aggregated	1986/87	82	71[4]	--	92	91	--	102[5]	106[5]	--

[1] In global-trend studies projections are based on global data; in aggregated studies, on an aggregation of country/regional models.

[2] IWC – International Wheat Council; ADTR – Australian Department of Trade and Resources; MSU – Michigan State University; IIASA – International Institute for Applied Systems Analysis; EIU – Economist Intelligence Unit; and FAPRI – Food and Agricultural Policy Research Institute.

[3] 1991.

[4] Food Grains.

[5] 1996/97.

SOURCE International Wheat Council, "Long term grain outlook," Secretariat Paper no. 14, London, England, August 1983; Australian Department of Trade and Resources, "The world food economy in the 1980s," December 1982; Michigan State University, "Long term forecast," Department of Agricultural Economics, East Lansing, Fall 1982; R. M. A. Loyns, and Colin A. Carter, "Grains in western Canadian economic development to 1990," Economic Council of Canada, Discussion Paper 272, Ottawa, September 1984 (the three preceding works were also cited in this discussion paper); David C. Cole and Susan Horton, "World grain trade and its financing: Past patterns and future prospects," Development Discussion Paper 195, Harvard Institute of International Development, Cambridge, Mass., May 1985; K. Parikh, G. Fischer, K. Frohberg, and O. Gulbrandson, *Toward Free Trade in Agriculture*, IIASA (forthcoming); Richard Woodhams, *Wheat to 1991: Adapting to Oversupply*, Economist Intelligence Unit, Special Report 1070 (London, England: Economist Publication, Ltd., 1986); Mathew Shane, *Patterns and Trends in World Wheat Competitiveness*, ERS Staff Report AGES861126 (Washington: USDA, March 1987); and FAPRI, *Ten-Year International Agricultural Outlook*, Staff Report 1-88, CARD/Trade and Agricultural Policy Discussion, Department of Economics, Iowa State University, Ames, Iowa, March 1988.

Table 5-2

World Trade in Wheat, Coarse Grains, and All Grains, 1980, 1985/86, and 1986/87

		Wheat	Coarse grains	All grains
Data source:				
USDA/FAS	1980	69.9	118	228[1]
	1985	97.8	105.7	215
FAO[2]	1980/81	92	102	206
	1985/86	85	82	179
USDA/FAS[3]	1986/87	90.1	87.5	189.4

1 Figure is 215.2 if intra-EC trade is excluded.

2 United Nations, *Food Outlook: Statistical Supplement* (Rome: FAO, 1986).

3 U.S. Department of Agriculture, *World Grain Situation and Outlook*, Circular FG-6-87, May 1987.

Woodhams has the most difficulty with China, which could become either a large importer or exporter. Similarly, Butler identifies China and Southeast Asia as regions whose growth potential could impact significantly on total trade. Butler is not willing, however, to hazard a guess as to which way either will go.

What should we learn from this? First, the longer the term of the projection, the more sensitive it is to assumptions regarding population and income growth. Second, the base period is critical. Third, the methodology must be clearly understood. It seems that, depending upon one's predilections about the future, one can choose a projection that is either optimistic or pessimistic. There is clearly no consensus to guide us. Based on the first two-thirds of the 1980s, however, it is highly likely that trade will be stagnant into the early 1990s. All of these projections assume no significant changes in major trade policies in the world market. We shall now address the potential impacts of trade liberalization.

Prospects under Liberalization

What does removing trade distortions of the magnitude listed above mean for Prairie agriculture? At least 10 different models of global agricultural trade are currently being used in different institutions around the world to find answers to related questions. Fully detailed information and documentation are not available for all models, however. What follows is a brief statement about each of the models for which the information was available. An overview of the models is provided in summary form in Figure 5-1; then a discussion of the model's predictions is provided.

Mathematical Trade Models

A well-grounded understanding of the structure of international commodity markets is essential before undertaking an analysis of the impacts of freer trade. The mathematical models reviewed below were used by various individuals and organizations to attempt to represent the "workings" of the international markets through mathematical equations. The equations are used to explain important behavioural relationships, such as trade flows and price responsiveness.

The models reviewed in this chapter range, in terms of their complexity, between regional coverage and commodity coverage. In model building there are clearly trade offs between commodity and regional detail. For example, a model that focuses on one commodity (such as wheat) may enable the builder to include a large number of countries/regions. Alternatively, those models which include a large number of commodities generally do not have an extensive amount of regional detail. Dynamic models are designed to estimate the "time paths" of variables (e.g., prices). In contrast, static models compare alternative equilibrium states (e.g., before and after free trade) and ignore time-path adjustments.

There are many different solution approaches and techniques available to model-builders. Quite often, the solution technique chosen depends on the complexity of the model. For some of the extremely large detailed models, the behavioural relationships that appear in the equations are often "synthesized" rather than estimated with statistical tools.

The majority of the models available are "partial-equilibrium" models, which means they study a single market (e.g., wheat) or a small set of markets (e.g., wheat, beef, and corn). The interrelationships between the agricultural sector and the rest of the economy are ignored with partial-equilibrium models. In contrast, a general-equilibrium approach attempts to account for all of the major intersectoral linkages in the economy.

The Trela, Whalley and Wigle Models

John Whalley[4] and his associates have developed two computable general-equilibrium models (cge's); these

Figure 5-1

Characteristics of Various Trade Models

	Countries/regions[1]	Commodities	Type of model	Purpose of model	Policy variables
			(Equilibrium)		
Model:[2]					
WWTM	Industrialized: 7 Developing: 10 CPEs: 3	Wheat	Partial	To explain and describe the world's wheat trade	Price-transmission linkages
GOL	Industrialized: 6 Developing: 18 CPEs: 3	20 – Divided into livestock and products; grains, oilseeds, and products; and industrial crops	Partial	To provide mid- to long-term projections of world food supply and demand, and to analyse the impact of policy changes on U.S. and world agricultural trade	Price-linkage equations and trade quotas
FAPRI	Industrialized: 5 Developing: 6 CPEs: 3	3 – Wheat, coarse grains, and soybeans	Partial	To quantify trade and policy interactions among major regions; to make intermediate term projections; and to conduct policy analysis	Price policies (tariffs, subsidies, loan rate)
IIASA	Industrialized: 7 Developing: 25 CPEs: 2	9 – Wheat, rice, coarse grains; ruminant meat; dairy products; other animal products; protein food, other food; plus one non-agricultural commodity	General	To analyse national and international policies in an international trade framework so those policies can be investigated	Domestic and international price policies; trade quotas
WBM	Industrialized: 6 Developing: 15 CPEs: 3	4 – Wheat, rice, coarse grains, and soybeans	Partial	To provide medium-term projections and a global framework in which policy models can be built and simulated	U.S. loan rate as an exogenous variable in the world price equation
Tyers and Anderson	Industrialized: 7 Developing: 5 CPEs: 1	7 – Wheat, rice, coarse grains; meat of ruminants and nonruminants; dairy products; and sugar	Partial	To estimate the effects of industrial countries' policies on international food prices, trade, and the world's economic welfare	Price-transmission equations reflecting government policies

Figure 5-1 (concl.)

	Countries/regions[1]	Commodities	Type of model	Purpose of model	Policy variables
			(Equilibrium)		
Trela, Whalley, and Wigle (grain)	Industrialized: 4 Developing: 4 CPEs: 1	2 – Grains and other commodities	General	To measure the order of magnitude of trade, price, and welfare effects of global liberalization of grain policies	Implicit price-support policies
Trela, Whalley, and Wigle (wheat)	Industrialized: 6 Developing: 5 CPEs: 2	2 – Wheat and other commodities	General	To illustrate the importance of more explicit modeling of agricultural policies	Implicit price-support policies
MSU international model	Industrialized: 5 Developing: 5 CPEs: 2	8 – Wheat, soybeans, coarse grains, rapeseed, sunflower, palm kernel, cottonseed, peanuts	Partial		Loan rate as an exogenous variable
SWOPSIM	Industrialized: 4 Developing: 1 CPEs: 1	13 – Beef and mutton, pork, poultry, dairy products, corn, other coarse grains, soybeans, other oilseeds, cotton, sugar, tobacco, wheat, rice	Partial	To simulate the effects of changes in policies on agriculture and agricultural trade	Price-transmission equations reflecting government policies

1 Including CPEs – centrally planned economies.
2 WWTM – World Wheat Trade Model;
GOL – Grains, Oilseeds, and Livestock model;
FAPRI – Food and Agricultural Policy Research Institute;
IIASA – International Institute for Applied Systems Analysis model;
WBM – World Bank Model;
MSU – Michigan State University model;
SWOPSIM – Static World Policy Simulation Model.

were designed for agricultural policy evaluations. They were among the first cge's to be constructed for global agricultural trade. Their first was a grain (rice and wheat) model, which covers nine countries/regions. The specific objective of this model is to measure the order of magnitude of trade, price, and welfare effects of global liberalization of grain policies. This objective is more clearly defined than that of most of the other models surveyed in this report. Their second model is a cge world-wheat model that covers 13 countries/regions. It was designed for a more explicit modeling of agricultural policies. One attractive feature of these cge models is that they have relatively few equations and parameters, and sensitivity analysis (e.g., with elasticities) can be conducted with relative ease. That is not to say that these models do not provide estimates that are every bit as good as those obtained from the large-scale econometric models.

The Tyers and Anderson Model

The Tyers and Anderson[5] model is a partial-equilibrium model designed to measure the impacts on agricultural trade of distorting policies in developed countries. It includes seven major commodity groups within the grain, livestock, and sugar categories, as well as 30 countries or regions. The model is dynamic in structure; so policy changes over the short and long run can be simulated. The model includes uncertainty in production, and the stock-holding decision is endogenized in the model. Policy variables are incorporated via price-transmission elasticities. In cases where internal prices are isolated from the world price, these price-transmission elasticities are set to be less than unity. This model has been used extensively by the World Bank and other agencies, and it is considered to be one of the most comprehensive and useful models available.

The FAPRI Model

The Food and Agricultural Policy Research Institute (FAPRI)[6] model is a partial-equilibrium econometric model, based at Iowa State University. It was designed to provide medium-range policy-impact projections for three commodity groups (wheat, coarse grains, and soybeans) and for 14 regions. Policy variables in the developed countries are included in the model as exogenous variables and also via price-transmission elasticities. One nice feature of the model is that it is dynamic in nature.

The IIASA Model

The International Institute for Applied Systems Analysis (IIASA)[7] model is the most comprehensive of the group of models surveyed. It is a general-equilibrium model that was designed to analyse food and agricultural policies and to provide long-run projections. At the world level, it includes eight agricultural commodity groups and one nonagricultural sector, and the model encompasses 34 countries or regions. The supply side of the national model contains between nine and 12 commodities. It is capable of running a trade-liberalization scenario in which explicit results with regard to production, exports, and prices are obtained.

The GOL Model

The USDA Grains, Oilseeds, and Livestock (GOL)[8] model is a partial-equilibrium model consisting of 20 different commodities and 27 countries or regions. The GOL is one of the original global models, although it has been modified extensively over the years. A separate model is built for each country/region, and these are then linked via a world-market clearing mechanism. Many of the parameters of this model are synthesized rather than estimated econometrically. The model incorporates quantitative trade restrictions through export and import quotas. In those countries/regions where trade restrictions do not exist, internal prices are equated to world prices. The main objective of the GOL model is to provide medium- to long-term projections of the global supply and demand for food. This model is not capable of generating a trade-liberalization policy scenario unless it is done in very crude fashion.

The World Bank Model

The World Bank[9] model is a partial-equilibrium model that consists of four commodity groups and 24 countries or regions. The main objective of the model is to provide medium-range projections of world prices, production, consumption, trade, and stocks. Policy analysis is another stated objective of the model. The U.S. loan rate for grain is the only explicit policy variable included in the model, however. It was incorporated in the U.S. price equation on the assumption that the U.S. price represents the world price. There is no documentation available to provide information on a trade-liberalization scenario.

The MSU Model

The Michigan State University (MSU)[10] model is a partial-equilibrium model. Its most comprehensive component is the U.S. model, which can be linked to 11 other country/regional models. It includes eight commodities, of which the most important are wheat, coarse grains, and the soybean complex. In each region, equations for area, yield, stocks, and net imports are estimated. Consumption is modeled as an identity. The objective of the model is not clearly spelled out in the available documentation. The model does not include explicit policy variables, although trade policies such as those pertaining to tariffs, subsidies, and other taxes are implicitly included in the price elasticities for most of the regions. The model is capable of establishing some projections under a trade-liberalization scenario for wheat, coarse grains, and the soybean complex.

The Static World Policy Simulation Model (SWOPSIM)

This USDA[11] model is a partial-equilibrium, static model that provides a framework for simulating changes in agricultural policies. It is set up as a computerized spreadsheet and is designed to run on a personal computer. Policy variables are not explicitly included in the model; instead, they are included through the price-transmission elasticities. A smaller version of the model, called the STLIB – Small [world agricultural] Trade-Liberalization model – has been utilized for a trade-liberalization scenario.

The WWTM

The World Wheat Trade Model (WWTM)[12] has been developed by the U.S. Department of Agriculture and is used quite regularly because of its simplicity and ease of use. It is a spatial price-equilibrium model that explains trade flows based on transportation costs. It is static and representative of the world's wheat market for one year only. There are six exporting regions and 17 importing regions represented in the model. The model contains excess-demand functions for the importing regions and domestic supply and demand functions for most of the exporting regions. The equations are not estimated econometrically. Rather, they are synthesized in order to reproduce the quantity of wheat traded and the border price in each exporting region in the base year 1984/85. The model generates a "free-trade" solution through simulating the removal of policy distortions in the European Community, Japan, and the United States.

Impacts of Trade Liberalization in Agriculture

The problem with comparing the various models listed in Figure 5-1 is that they were all designed and constructed for different purposes. Notwithstanding this problem, a common point of reference is the "free-trade" scenario, and it will be utilized in this report. As indicated above, not all of these models are capable of estimating the results of liberalizing agricultural trade. Models that have that capacity are listed separately in Table 5-3, along with their respective estimates.

Border protection in each country in the IIASA model is incorporated with estimates of tariff equivalents as a percentage of the world market price. The IIASA "free-trade" scenario involves the estimated impact of removing the distortions between border prices and domestic prices. Thus this is not a total trade-liberalization scenario. Projections of the impacts of trade liberalization are made to the years 1990 and 2000. The results for 1990 indicate that wheat prices will increase by 16 per cent and trade volume by 1 per cent. It is projected that the European Community will experience a large drop in wheat exports.

The Trela, Whalley, and Wigle (TWW) results of trade liberalization indicate that international trade will increase significantly and that prices will increase by 11.8 per cent. Their model also reports a significant impact on farmland prices.

According to the FAPRI model, wheat prices will increase by 26.8 per cent – and trade, by 2.3 per cent – under a "free-trade" scenario. This model gives a higher projected wheat-price increase than any of the other models surveyed. For coarse grains, the estimated impact on the volume of trade is low, but prices are projected to increase by 12.4 per cent.

Results from the Tyers and Anderson model show a 25-per-cent increase in the wheat price and a 3-per-cent increase in coarse-grain prices under freer trade. The model estimates an annual net global-economic-welfare gain of $74.9 billion by 1995 from liberalizing all food policies. The projections show that all regions except Africa and the Middle East would experience net economic-welfare gains. Global gains would far outweigh the net welfare loss in Africa and the Middle East. If liberalization only takes place in the developed world, Tyers and Anderson project a welfare gain of about one-half of what it would be if all countries (developed and developing) participated in liberalization.

The MSU model projects that under freer trade there will be a decline in the overall volume of wheat traded internationally, but prices will increase by 9.2 per cent by 1990. Trade volume declines, largely because EC exports fall dramatically. For coarse grains, the results show a small increase in the volume of trade and a price increase of only 1.3 per cent. As with the FAPRI model, the price of oilseeds is projected to decline under freer trade. This is in sharp contrast to the IIASA and SWOPSIM results, which show a price-enhancing effect for oilseeds.

Like the MSU model, the SWOPSIM results show the world's wheat trade declining and the trade in coarse grains increasing. Global production of both wheat and coarse grains is estimated to fall with removal of distortions. The SWOPSIM projects an increase of 3.7 per cent in the price of wheat, which is quite low relative to that projected by the other models. In terms of welfare, SWOPSIM indicates an annual gain of $22.5 billion as a result of the multilateral removal of agricultural support programs.

Trade barriers, such as the use of variable levies by the European Community, not only reduce both the price and volume of exports from countries such as the United States and Canada; they also heighten the degree of price instability for these exporters. This has been clearly demonstrated by Sampson and Snape and by Carter and Schmitz.[13] In essence, importers, through protectionism policies, can manufacture price instability for exporters. This comes at a cost to exporting regions. Trade liberalization reduces price variability in trade; thus, as Valdés correctly argues, the price stability that results from freer trade should be included when discussing the gains from liberalization.[14] The previous models understated the gains from liberalization because arguments about price-instability transmission are not taken into account. Both Schiff's study of wheat in the European Community (1985)[15] and Tyers and Anderson's study (1986) conclude that changes in the system of protection would contribute significantly to world-price stability.

Table 5-3

Impact of Trade Liberalization on the Grain Industry, as Projected by Different Models*

	Total grains			Wheat			Coarse grains			Oilseeds		
	Production	Trade	Price	Production	Trade	Price	Production	Trade	Price	Production	Trade	Price
						(Per cent)						
Model:												
IIASA[1]	--	--	--	1.4	1.0	16.0	0.7	–4.0	17.0	2.7[2]	5.0[2]	11.0[2]
TWW[3]	1.1	–[4]	11.8	--	--	--	--	--	--	--	--	--
FAPRI[5]	--	--	--	–4.4	2.3	26.8[6]	–[7]	–[7]	12.4[8]	–[7]	–4.4[9]	–2.5[10]
Tyers and Anderson[11]	--	--	--	--	--	25.0	--	--	3.0	--	--	--
MSU[12]	--	--	--	–0.8	–1.9	9.2	–	0.6	1.3	–0.9[13]	–4.0[14]	–1.1[15]
SWOPSIM[16]	--	--	--	–0.4	–2.0	3.7[17]	–0.9[18]	1.0[18]	6.6[17,18]	–[19]	–[20]	3.5[13]
WWTM[21]	--	--	--	--	–0.8	4.9[22]	--	--	--	--	--	--

* For a fuller explanation of the different models, see footnote 2 of Figure 5-1.

1 Projected change from 1985 to 1990.
2 Protein feed.
3 Projected change from 1980 base year.
4 Rises significantly but is not reported explicitly.
5 Projected change for 1989/90.
6 U.S. price.
7 Less than 1 per cent.
8 U.S. corn price.
9 Soybeans only (soybean meal, –6.2).
10 U.S. soybean price (soybean meal price, –5.8).
11 Projected change from 1988 to 1995.
12 Projected change from 1986 base year to 1990/91.
13 Soybeans only.
14 Soybeans only (soybean meal, –1.0).
15 Soybean price (soybean meal price, –2.7).
16 Projected change from base year.
17 Result of removal of programs in the United States, Canada, the European Community, and Japan.
18 Corn only.
19 Soybeans only (soybean meal, –0.1).
20 Soybeans only (soybean meal, –1.0).
21 Projected change from 1984/85 base year.
22 U.S. export price.

SOURCE Estimates generated by the various models.

For example, Schiff (1985, Table 25) estimates that the variability in world prices of wheat would fall from a coefficient of variation of 0.46 to 0.32 if the European Community alone were to remove its trade barriers on wheat. The discussion on commodity-price stabilization and buffer-stock schemes argues for price stability; hence in this context the gains from freer trade are positive.

Summary and Limitations

There are a large number of models available that mathematically represent global trade in agricultural products. These models were constructed for varying purposes, but several of them have projected the outcome associated with freer trade. The welfare gains range from $22.5 billion to $74.9 billion per year. Wheat prices are projected to increase anywhere from 3.7 to 26.8 per cent if the policy distortions are removed.

Modeling the international food market is a difficult problem; and it seems the more complicated the model, the less that standard econometric techniques can be relied upon to provide reasonable results. Data problems become a major constraint. As a consequence, most of the models have a combination of synthesized and estimated parameters.

There is a strong bias towards food grains in the models surveyed. The linkage of livestock products with grains is not that well developed in the models to date. This is especially important for the newly industrialized countries (NICs), where incomes are growing rapidly. The latest international trade literature on imperfect competition (e.g., that of Helpman and Krugman)[16] has not been incorporated into global food models, and considerable research is required in that area. In almost every model, the centrally planned economies (CPEs) are treated in either residual or very crude fashion. The CPE countries account for a large percentage of Canada's wheat sales (the Soviet Union and China alone purchase over 50 per cent of Canada's wheat exports); thus further effort is needed to "model" CPE trade behaviour. As Chapter 2 of this report pointed out, the CPEs present an enigma for the future of the Canadian prairies.

The results from the above models as to the effects of freer trade should be interpreted with caution for several reasons, the most important of which is perhaps the problem created by treating the effects of the imposition of tariffs and subsidies symmetrically with the effects of their removal. To illustrate this point, consider the effect of the formation of the European Community with the accompanying high, internal producer prices and trade-restrictive practices. Over the course of 12 to 15 years, grain production soared, with the result that the European Community shifted from being a major importer to being a net exporter. It now ranks with Canada as a wheat exporter.

The European Community not only raised producer prices; it also stabilized them, unlike the prices in many other countries. Because of the high and stabilized prices, a learn-by-doing phenomenon occurred, which resulted in large production increases. Once the infrastructure is in place, the effects of lowering internal prices through trade liberalization are not nearly as great in reducing output as protection was in increasing output (Appendix E).

The United States and Canada rank lowest among the industrialized nations of the world in terms of value-added exports. A large percentage of grains, for example, are exported in raw form. The models reviewed do not address the question of the impacts of freer trade on value-added activities. In Chapter 6 an example is cited where the Japanese use variable levies on Canadian exports of canola oil to discourage processing in Canada. How widespread these types of activities are is not addressed in this study. It is safe to assert, however, that value-added activities in major exporting regions such as Canada would increase with more liberalized trade; hence the gains from freer trade that are predicted here are conservative.

In addition, since these studies were completed, trade distortions have increased through the use of such instruments as the Export Enhancement Program. As distortions to trade increase, so do the potential benefits of their removal. More recent estimates would probably show even greater gains from trade liberalization than were indicated earlier.

The distributional effects of trade liberalization among sectors cannot be overemphasized. Under GATT, are the negotiators prepared to harm agricultural producers to ensure gains for consumers and taxpayers? Producer support for trade liberalization in many of the countries will be lacking. Also, within countries, there will be losers and gainers from freer trade among the different producers. For example, in Canada, because supply management boards are more pronounced in eastern Canada than in the West, agricultural interests in the East will not generally be in favour of freer trade, under either GATT or the Canada-U.S. Free-Trade Agreement. The opposite will generally be true for western agriculture, where the grain sector predominates. Who, then, will Canadian negotiators negotiate for? Will it be for wheat, broiler, or dairy farmers; the consumer; or the taxpayer?

The above merely points out the issues that policymakers will have to deal with in their attempts at trade reform. Given the high degree of distortions in agriculture and the potential gains from freer trade outlined above, it is difficult not to support the intent of GATT, recognizing that unless the obstacles are foreseen and dealt with, reform will be extremely difficult.

A second major point concerns the gains to farmers from the freer trade brought about by trade liberalization. Because of the large subsidies that now exist, a large percentage of farmers' incomes is derived from government subsidies rather than the marketplace. If one were to accept the optimistic prediction that grain prices would increase by 30 per cent for exporters because of trade liberalization, then it is not clear whether U.S. farmers would benefit, since the gains from trade liberalization would only partially offset government subsidies to farmers (Schmitz, Sigurdson, and Doering,[17] and Appendix F of this study). It is clear, however, that EC and Japanese farmers would lose from liberalization. Also linked to producers are the input suppliers (e.g., fertilizer and chemical companies) and the grain companies and processors. These interest groups also play a role, and whether they do or do not support free trade will depend on their perception of whether freer trade will increase the demand for their services.

The effect of trade liberalization on each country's producers would be different because of the different levels of subsidies. Because of the high U.S. farm subsidies, trade liberalization may not increase producer prices in the United States, because the wheat target price for farmers is at $4.24/bushel. In Canada, on the other hand, trade liberalization would likely result in an increase in the producer's price.

An estimate of the balance of benefits and costs from trade protectionism is displayed in Table 5-4. These figures are based on the 1984 market situation and were obtained from the SWOPSIM model.[18] The SWOPSIM model estimates that Canadian farmers lost US$300 million in 1984 because of global trade barriers. Alternatively, farmers in the United States, the European Community, and Japan gained from protection. From the table it is clear that taxpayers lose from protectionism and thus stand to gain the most from trade liberalization in the European Community. In Japan, it is clearly the consumer who would gain; Japanese consumers lose an estimated US$17.26 billion from protectionism. On a per-capita basis, the 1984 net cost of protectionism was $99 in Canada, compared with $16 in the United States. This indicates that Canada has proportionately more to gain from global liberalization than the United States or Japan.

As outlined in Chapter 4, many countries, including Canada, have an array of farm programs. As pointed out, Canada's include the Special Grains Program and programs under the *Western Grain Stabilization Act*. The problem with liberalization is to decide which of these is to be removed, if any, or in what combinations? What is the optimal strategy for trade-distortion removal, and what types of instruments are to be removed? Which are more trade-distorting than others?

Table 5-4

Global Costs and Benefits of Agricultural Protection, Selected Countries, 1984

	Consumer costs	+	Taxpayer costs	–	Producer benefits	=	Total domestic costs	Cost per capita
			(Billions of US$)					(Dollars)
United States	–3.7		15.9		8.4		3.8	16
Canada	0.2		1.9		–0.3		2.4	99
European Community	12.5		16.0		18.4		10.1	32
Japan	17.2		4.2		14.2		7.2	60
World	10.7		38.7		25.5		23.9	

SOURCE A. J. Webb, V. O. Roningen, and P. Dixit, "Analyzing agricultural trade liberalization for the Pacific Basin," a paper presented by the Livestock and Feed Grains Working Group for the Pacific Economic Cooperation Conference Council, Napier, New Zealand, October 1987.

6 Canadian-Japanese Agricultural Trade: A Case Study

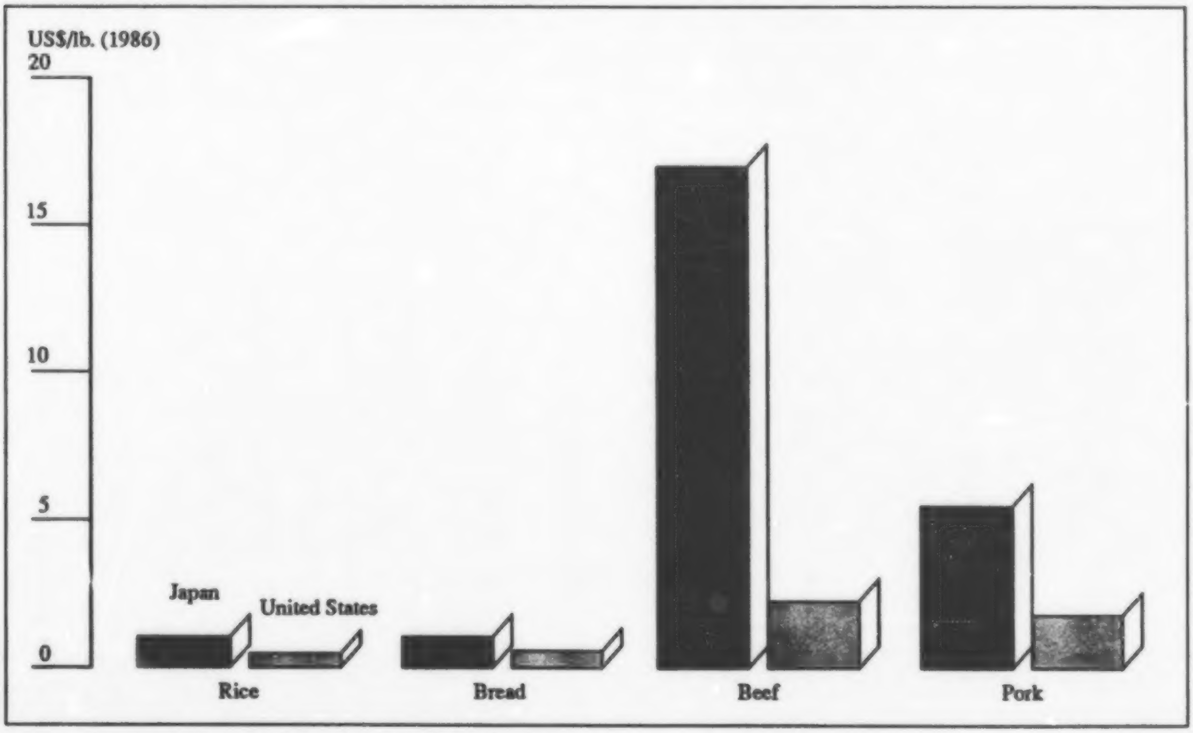
Whereas the previous models gave some general information on the effects of trade liberalization, they do not cover the detailed policy effects for a given country or region. The following discussion focuses on Canadian trade with Japan and the implications of freer trade regardless of how it is achieved. Wheat is not the only agricultural commodity produced and exported from the Prairie region to Japan. Canola, barley, and pork are also important.

Background

Japan is the largest net food importer in the world, and Canada ranks among its major suppliers. As the earlier discussion showed, however, Japan has in place significant trade barriers to food imports. Japanese consumers pay many times the world price for food (Chart 6-1). The retail price of rice in Japan is roughly double that paid in the United States; beef prices are roughly eight times higher, and Japanese consumers pay about three times the U.S. price for pork. On average, consumers in Japan spend 30 per cent of their income on food; by comparison, in Canada and the United States the figure is around 15 per cent. Japanese agricultural policy is driven by the desire for "food security." The Japanese farmer, however, produces only one-half of the calories that people eat, down from 80 per cent just after the Second World War.

Chart 6-1

Retail Food Prices, Japan and the United States, 1986



SOURCE American Embassy, Agricultural Affairs Office, Tokyo, Japan.

Government agencies in Japan control the importation of many food products (e.g., wheat and beef). These agencies import commodities at world prices and then charge a much higher price upon resale in Japan. The profit margins are used to offset Japan's farm subsidies. The Japanese government made about $1.6 billion in profits on wheat imports alone in 1987, part of which was used to cover the cost of their rice-production subsidies.

This means that Japanese farmers are highly protected, probably more so than farmers in any other country. Chart 6-2 displays the gap between Japanese farm and import prices (c.i.f.). Farmers in Japan were paid $83 per cwt. for rice in 1986, compared with an average c.i.f. import price of $8.16. The Japanese farmer was paid close to seven times the landed import price for wheat; over 21 times the world price for barley; and 3.5 times the world price for soybeans.

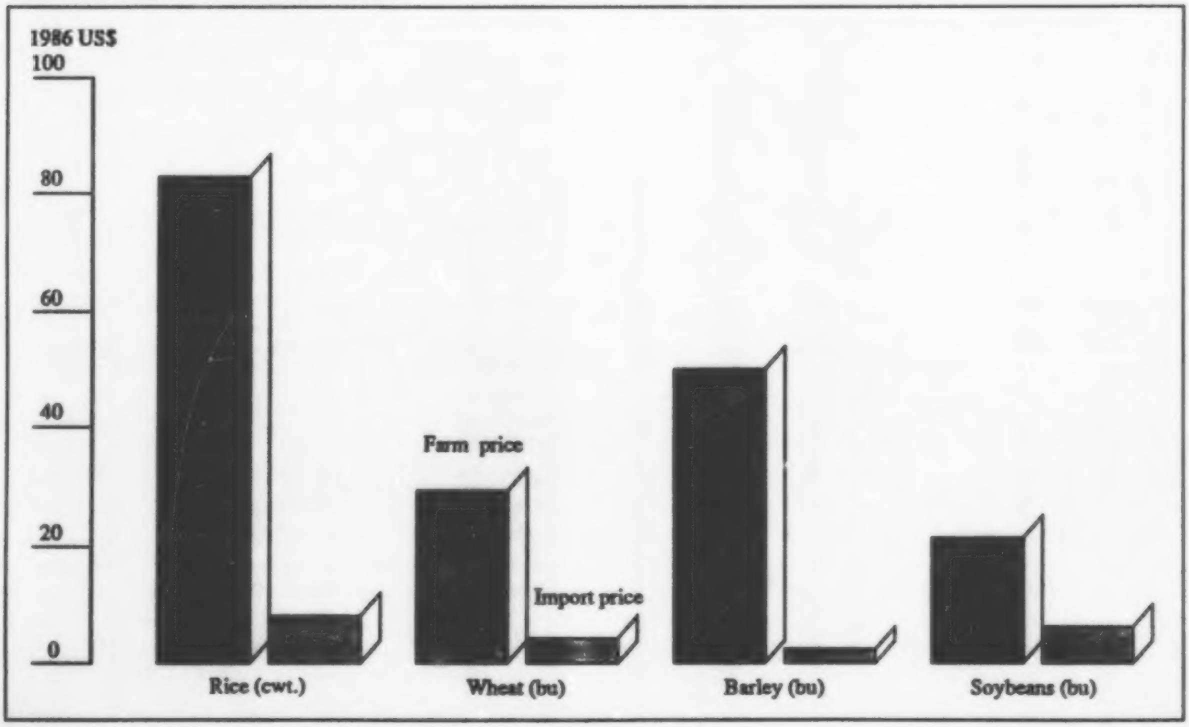
Canola, wheat, and barley account for between 65 and 75 per cent of the value of Canada's agricultural exports to Japan, with canola being the most important. Canada is the world's largest exporter and producer of canola, and the largest importer is Japan. In competition with Canada for the Japanese grain market are the United States and Australia. The United States is the largest food exporter to Japan, followed by Australia and then Canada. The United States supplies approximately 40 per cent of Japan's import needs; Australia, 10 per cent, and Canada, 7 per cent. The composition of U.S. exports to Japan differs in many important aspects from that of Canada's. For example, Canada exports barley and canola, while the United States exports corn and soybeans. The three major Japanese agricultural imports in terms of value are corn, soybeans, and wheat.

Wheat and Feed Grains

Canada's share of Japan's wheat market has been falling relative to its competitors' share – for instance, that of the United States. Table 6-1 shows that Japanese wheat imports

Chart 6-2

Farm and Import Prices, Japan, 1986



SOURCE American Embassy, Agricultural Affairs Office, Tokyo, Japan.

Table 6-1

Volume of Wheat Imported by Japan, Crop Years 1959/60 to 1984/85

	Australia	Canada	United States	All countries[1]
		(Thousands of tons)		
Crop year:[2]				
1959/60	379	1,255	909	2,566
1960/61	358	1,539	916	2,834
1961/62	427	1,331	1,036	2,795
1962/63	345	1,262	1,005	2,663
1963/64	512	1,309	2,041	3,919
1964/65	443	1,433	1,678	3,584
1965/66	364	1,285	1,943	3,592
1966/67	431	1,620	2,136	4,260
1967/68	613	1,097	2,228	4,028
1968/69	1,147	1,247	1,839	4,267
1969/70	1,018	1,068	2,382	4,502
1970/71	821	1,000	2,878	4,834
1971/72	1,495	1,395	2,216	5,106
1972/73	752	1,364	3,373	5,569
1973/74	428	1,692	3,067	5,353
1974/75	1,009	1,187	3,073	5,404
1975/76	1,063	1,602	3,344	6,009
1976/77	1,076	1,320	3,152	5,548
1977/78	1,158	1,352	3,269	5,779
1978/79	969	1,236	3,232	5,744
1979/80	985	1,290	3,148	5,606
1980/81	914	1,463	3,525	5,930
1981/82	943	1,335	3,358	5,637
1982/83	934	1,357	3,294	5,597
1983/84	1,043	1,416	3,441	5,901
1984/85	1,039	1,385	3,324	5,748

1 That is, all exporters to Japan.

2 Crop year runs from July 1 to June 30.

SOURCE: Based on data from the Food and Agriculture Organization of the United Nations; Canada Grains Council; and International Wheat Council, *World Wheat Statistics*, various years.

from Canada have remained stable at around 1.3 million tons since 1959/60. On the other hand, U.S. wheat exports to Japan have tripled since the early 1960s. These data are also displayed in Chart 6-3.

Table 6-2 provides data on Japanese wheat imports from all regions, by class. Interestingly enough, Japan does not purchase wheat from exporters such as the European Community or Argentina. Japan is not only inflexible with regard to the country of origin of its wheat imports but also with regard to the class of wheat imported. Unlike the Soviet Union and China, Japan imports only "high-quality" wheat from Canada. Australia and the United States export wheat to Japan for feed; Canada does not.

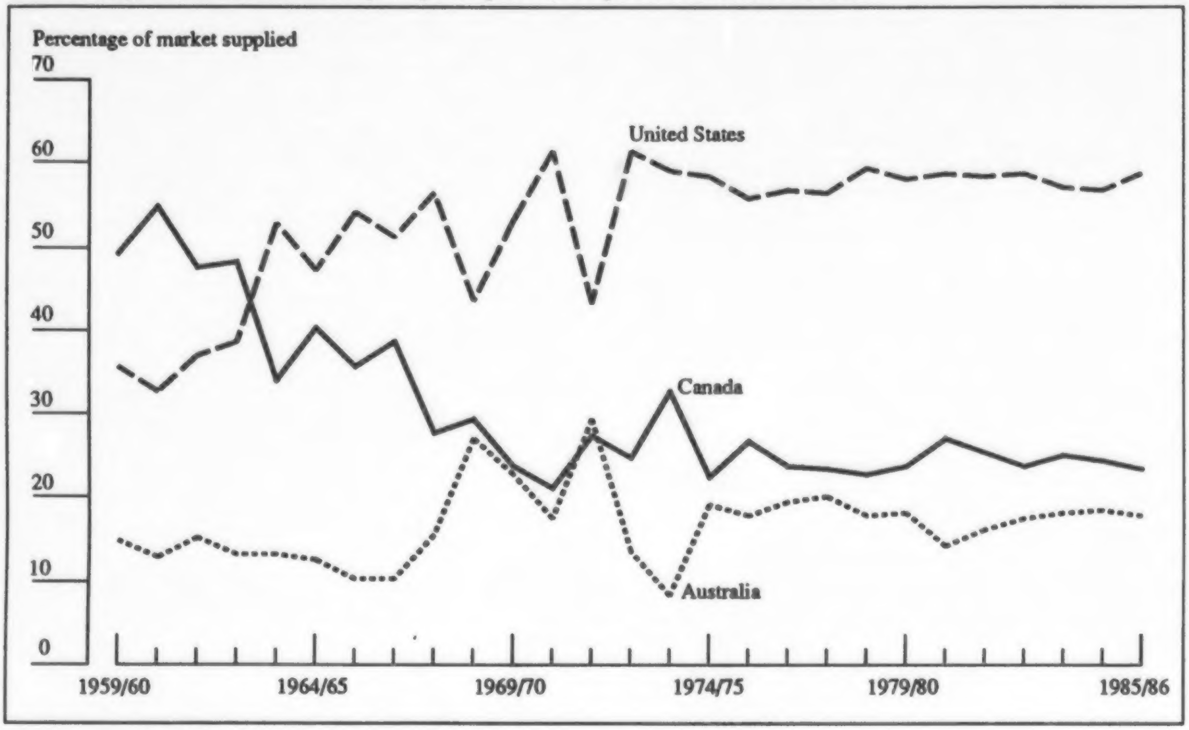
The pricing policy for wheat in Japan is highly distortionary. The farm price of wheat in periods of "tight" markets is four to five times the world price in Japan. The price paid by Japanese consumers, however, is somewhat lower but still well above world export prices. For example, in 1986 the government purchasing price for wheat was $29.25/bushel – about six times the cost of imported wheat. On February 7, 1987, the Canadian Wheat Board f.o.b. price for wheat was US$146.90/ton, while the resale value (i.e., the price at which it was sold to mills by the Japanese Food Agency) was US$559.00/ton. It is therefore clear that producer and consumer prices in Japan have no relationship to world prices. As world prices fall, their imports become cheaper. Internal prices (the price that the Japanese Food Agency [JFA] charges consumers) do not fall in a period of declining world prices; thus the gap between internal Japanese prices and the world import price widens.

Canadian selling prices to Japan fluctuate up and down with the price of wheat in the United States. Consider the impact of the U.S. 1985 Farm Bill, which set domestic target prices and loan rates for commodities, including wheat and corn. The target price is the price guaranteed to producers, while the loan rate (which is well below the target price) is the floor price for grain sales. As part of the 1985 Bill, loan rates were substantially lowered, by about $40/ton. A lowering of the loan rate by the United States, which is the world's largest wheat exporter, enables buyers such as Japan to buy imported grain more cheaply from all suppliers. In order to compete, Canada has also had to lower its export price. Who are the gainers? Clearly, Japan gains from a lower loan rate. Since Japanese producers and consumers are not affected directly because of fixed internal prices, the gainer is the Japanese Food Agency (JFA), since it can now purchase wheat on world markets at a lower price. Note that with a drop in world prices, the volume of Japanese imports did not rise, because internal prices are fixed. A drop in the loan rate by $1.00/bushel results in a gain to the Japanese Food Agency of roughly US$200 million; the loss to Canada is roughly US$45 million.

Corn is imported freely into Japan without quota restrictions, but quotas are placed on barley imports because barley is treated as a food grain by the Japanese government. The U.S. corn exports therefore do not have to compete directly with Canada's barley exports. This means that barley accounts for a very small percentage of feed-grain

Chart 6-3

Share of Japan's Wheat Market, by Major Exporter, Crop Years 1959/60 to 1985/86



SOURCE International Wheat Council, *World Wheat Statistics*, various years.

utilization in Japan. The implications of this for Prairie farmers are clear. If the JFA viewed barley as a feed grain, Canadian barley exports to Japan would presumably rise; then exports from Canada would partially displace U.S. corn sales.

Canola

Canada is the world's largest exporter of canola. Japan's imports of canola from Canada increased from 101.3 thousand tons in 1965 to 1.4 million tons in 1986. For the five-year period 1981/82-1985/86, Japan accounted for 87.2 per cent of global canola imports. In 1960, Japan imported less than 10 per cent of its oilseed requirements from Canada, whereas by 1985 Japan's market share from Canada increased to above 20 per cent. This trend is in sharp contrast to that for wheat. Canada's share of coarse-grain sales to Japan has also declined. Japanese imports of coarse grains increased from 866,000 tons in 1970 to 1,418,000 tons in 1980 – an increase of 64 per cent – while Canada's exports only increased by 22 per cent.

Canola competes with U.S. soybean exports. Japan is a major importer of both canola and soybeans. By far the largest proportion of Japanese imports is in raw form rather than in processed form. Japan removed its tariff and quotas on both canola and soybeans following the Tokyo/Geneva Round of trade talks in the early 1970s. The important point, however, is that they maintained import tariffs on both crude and refined canola, and on soybean oil, of roughly US$70/ton. Its import duty on processed products has discouraged processing in both Canada and the United States, while increasing value-added activities in Japan. Carter and Johnson[1] have estimated that the complete removal of the canola- and soybean-oil tariffs would increase the net revenue of Canadian crushers by 6.3 per cent per annum. The use of tariffs by the Japanese has caused

Table 6-2

Wheat Imports, by Class, Japan, 1981-85

	1981	1982	1983	1984	1985
			(Thousands of tons)		
Food:					
United States					
Western White (WW)	895	926	923	832	778
HRW (11.5)	422	429	394	408	416
HRW (13.0)	425	389	411	440	386
DNS	704	791	765	842	865
Durum	13	19	6	7	48
Subtotal	2,459	2,554	2,499	2,529	2,493
Canada					
ICW	1,348	1,242	1,306	1,285	1,163
Durum	43	47	73	68	36
Subtotal	1,391	1,289	1,379	1,353	1,199
Australia					
ASW	270	266	293	325	276
Total	4,120	4,109	4,171	4,207	3,968
Feed:					
United States					
WW	227	140	195	176	131
HRW (Ord)	243	223	224	214	188
HRW (13.0)	208	218	218	213	199
Others	60	37	---	---	---
Subtotal	738	618	637	603	518
Australia					
ASW	344	355	357	362	320
PH	278	273	308	255	279
GP	---	48	33	81	64
Subtotal	622	676	698	698	633
Total	1,360	1,294	1,335	1,301	1,181

SOURCE Japanese Food Agency, unpublished data, November 1986.

financial problems to occur in the Canadian crushing industry. Chart 6-4 shows the wide discrepancy between Japanese and Canadian canola-crushing margins. Japanese margins average about US$145/ton, compared with only US$20/ton in Canada. This discrepancy is largely due to the Japanese import tariffs on oil. A removal of the tariff would reduce the profitability of crushing rapeseed in Japan, and that would lead to increased demand for canola-oil exports from Canada.

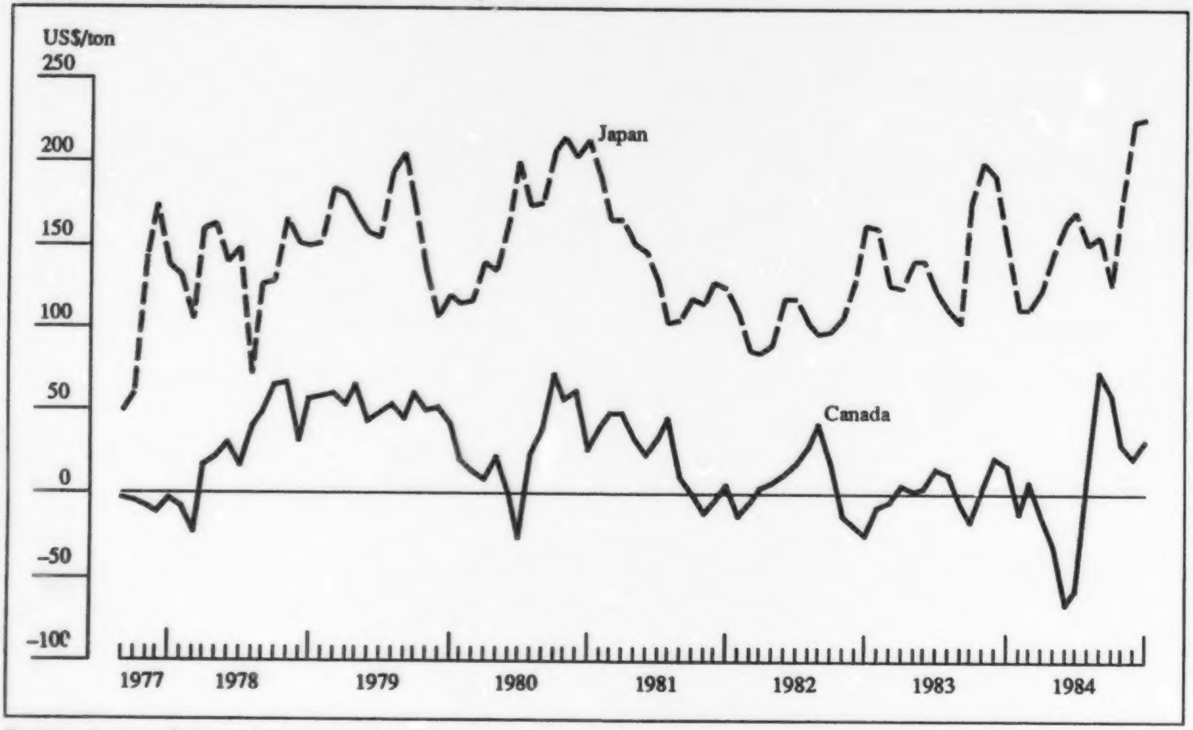
Pork and Beef

As with canola, Canada is a major supplier of pork and pork products to Japan. As Table 6-3 shows, however, Canadian pork exports to Japan declined significantly from 1981/82 through 1984/85, by approximately 50 per cent. For the same period, Japan's total imports of pork increased.

Pork imports from Canada are generally of high quality (Chadee and Carter).[2] Japan manages a price-stabilization

Chart 6-4

Rapeseed-Crushing Margins, Canada and Japan, 1977-84



SOURCE American Embassy, Agricultural Affairs Office, Tokyo, Japan; Statistics Canada, unpublished data.

Table 6-3

Canadian and U.S. Pork Trade with Japan, 1978-85

	Canadian exports	U.S. exports	Japanese imports
	(Thousands of tons)		
1978	32.0	21.4	103.3
1979	32.0	32.1	131.7
1980	32.0	27.7	108.2
1981	42.0	40.3	183.6
1982	44.0	30.2	141.1
1983	42.0	34.2	166.3
1984	29.0	18.9	195.6
1985	22.0	9.2	190.2

SOURCE Agriculture Canada, *Canada's Trade in Agricultural Products* (Ottawa: Supply and Services Canada, 1981, 1984, and 1987); U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington: USDA, selected years); and Food and Agriculture Organization of the United Nations, *FAO Trade Yearbook* (Rome: FAO, selected years).

system that maintains a price band for pork. To do this, a set of import tariffs are used. Chadee and Carter estimated the importance of the tariff to Canadian producers, using a spatial price model that incorporates econometric estimates of pork supply and demand equations (1970-84 quarterly data). They estimate that if the current tariff of 5.5 per cent on Canadian pork were removed, Japanese prices would decline by 9.5 per cent; Canadian prices would increase by 4 per cent; and the volume of trade would increase by roughly 8 per cent.

Table 6-4 displays the sources of Japan's beef imports. Japanese imports increased by roughly 50 per cent from 1979 to 1986. In 1979, the United States had 31 per cent of the Japanese import market; by 1986, it had 51 per cent. Note that the United States and Australia, combined, had 93 per cent of the market in 1986. Canada is an insignificant supplier of beef to Japan. This raises the issue of whether Canada can compete economically in the Japanese market or whether the allocation of quotas is largely political. Related to this issue, a recent study by the Australian Bureau

Table 6-4

Australian and U.S. Shares of Japan's Imports of Beef and Offal,[1] 1979 and 1986

	Beef imports		Offal imports		Total	
	Shipped weight	Value	Shipped weight	Value	Shipped weight	Value
	(Thousands of tons)	(Billions of yen)	(Thousands of tons)	(Billions of yen)	(Thousands of tons)	(Billions of yen)
1979						
Australia	100.4 (77)	63.6 (72)	10.7 (22)	6.4 (17)	111.1 (62)	70.0 (56)
United States	23.5 (18)	20.9 (24)	31.3 (65)	26.1 (72)	54.9 (31)	47.0 (38)
Others	5.7 (5)	4.3 (5)	6.4 (13)	3.9 (11)	12.1 (7)	8.2 (7)
Total	129.7	88.8	48.5	36.4	178.1	125.2
1986						
Australia	105.2 (59)	47.4 (51)	7.2 (8)	3.9 (6)	112.3 (42)	51.2 (32)
United States	63.4 (35)	40.3 (43)	74.3 (84)	57.2 (88)	137.7 (51)	97.5 (61)
Others	10.5 (6)	5.7 (6)	7.2 (8)	4.1 (6)	17.7 (7)	9.8 (6)
Total	179.1	93.4	88.7	65.2	267.8	158.6

NOTE Values in parentheses are market shares.

[1] The waste parts of animals killed for food.

SOURCE Australian Bureau of Agricultural Economics, "Japanese beef policies: Implications for trade, prices and market share," Paper no. 102, 1988, p. 6.

of Agricultural Economics suggests that with respect to the recent loss in Australia's market share, noneconomic factors are involved.

The beef trade in Japan is highly regulated by means of quotas. The Livestock Industry Promotion Corporation (LIPC) is the main regulatory agency. The entire LIPC share of the general beef import quota can be imported from any country satisfying Japanese import requirements. Thus there is no specific quota regulation, which explains the small market share of Canadian beef exports to Japan.

The LIPC has a virtual monopsony on beef imports and has protected Japanese producers from imports of high-grade beef by limiting tenders to lower grades. The proportion of U.S. beef that is of "high quality" is largely confined to the small-hotel and private quotas. Despite beef quotas, not only have Japanese beef imports increased; the U.S. share of the Japanese market has also increased, while Australia's share has declined somewhat. While Australia ships mostly grass-fed beef to Japan, the United States exports grain-fed beef.

Selective international wholesale beef prices are given in Table 6-5. Japanese prices are well above those of other major producing areas, and the ratios have been roughly stable since 1981. In 1983, U.S. prices were only 43 per cent of the Japanese level. Japan regulates its beef imports with a general quota and four major special quotas. Quotas are not allocated to specific countries; each country must compete for its share. By far the largest percentage of imports belongs to the general quota (e.g., 80 per cent), while special quotas take up the remainder (Table 6-6). The majority of the general quota is allocated to the LIPC.

Trade Liberalization

Japan has one of the highest levels of agricultural protection in the world, as measured by producer-subsidy equivalents (see Table 4-1). In addition, Japanese imports have increased despite a sharp increase in the level of agricultural protection. In 1955, the overall level of protection (tariff equivalent) was about 18 per cent; by 1980-82, it had increased to around 150 per cent at the producer level and

Table 6-5

International Comparison of the Wholesale Price of Beef Carcasses, 1978-83

	United States	Australia	European Community	Japan
		(Yen/kg)		
1978	376 (32.5)	177 (15.3)	563 (48.6)	1,158 (100)
1979	494 (37.2)	367 (27.7)	774 (58.3)	1,327 (100)
1980	529 (43.9)	397 (33.0)	846 (70.4)	1,202 (100)
1981	488 (42.8)	331 (29.1)	715 (62.8)	1,139 (100)
1982	559 (46.5)	298 (24.8)	783 (65.1)	1,202 (100)
1983	514 (43.4)	345 (27.2)	733 (62.0)	1,183 (100)

NOTE Figures in parentheses are relative prices, assuming that Japanese prices equal 100.
SOURCE Ministry of Agriculture, Forestry and Fisheries (MAFF), Tokyo, Japan.

to around 100 per cent at the consumer level. In 1955, the protection rate for rice was 24 per cent; wheat, 31 per cent; beef, 39 per cent; and milk, 4 per cent. By 1980-82, the producer protection rates had risen to 230 per cent for rice, 280 per cent for wheat, 300 per cent for beef, and 200 per cent for dairy products (Sanderson, p. 14).[3]

Some estimates have been made of the potential for gains from freer agricultural trade with Japan. The Tyers and Anderson study for the World Bank[4] suggests the possibility of an increase in Japanese imports under full liberalization of 6.3 million tons of rice, 3.0 million tons of ruminant meat, 14.3 million tons of dairy products, and 470,000 tons of sugar. The Japanese import bill in 1986 world prices would rise from $20 billion to $32 billion. Beef would account for the largest increase. It is estimated that world prices would rise (e.g., the prices of rice and beef would increase by 4 per cent; dairy products, by 3 per cent).

Table 6-6

Japan's Beef Import Quotas, 1975-86

	General quotas			Special quotas					
	LIPC	Private	Subtotal	Hotel and other	Okinawa	School lunches	Boiled and canned	Subtotal	Total
					(Tons)				
1975	69,900	5,100	75,000	1,000	5,500	1,000	2,500	10,000	85,000
1976	71,000	9,000	80,000	1,000	5,500	3,000	7,000	16,500	96,500
1977	73,000	7,000	80,000	2,000	5,200	2,200	3,100	12,500	92,500
1978	86,500	8,500	95,000	3,000	5,600	3,000	5,400	17,000	112,000
1979	105,600	10,900	116,500	3,000	5,800	2,500	6,700	18,000	134,500
1980	106,800	12,200	119,000	3,000	5,850	2,250	4,700	15,800	134,800
1981	99,900	11,100	110,000	3,000	5,850	2,250	4,700	15,800	126,800
1982	107,280	11,920	119,200	3,000	5,850	2,250	4,700	15,800	135,000
1983	112,680	12,520	125,200	3,000	5,850	2,250	4,700	15,800	141,000
1984	119,880	13,320	133,200	4,000	5,850	2,250	4,700	16,800	150,000
1985	127,260	14,140	141,400	4,800	5,850	2,250	4,700	17,600	159,000
1986	134,460	14,940	149,400	5,800	6,050	2,250	4,500	18,600	168,000

SOURCE Australian Bureau of Agricultural Economics, "Japanese beef policies: Implications for trade, prices and market share," Paper no. 102, 1988, p. 8.

As discussed earlier, Carter and Johnson estimated the effects of removing the import duty on Canadian canola-oil exports. It should be emphasized that Canada and the United States have, by far, the lowest value-added components of agricultural exports of all the high-income countries. The Japanese tariff system for items such as canola oil adds to the frustration in Canada over its low-valued exports.

Compared with the United States, Canada has proportionately more to gain from trade with Japan under liberalization. The United States has benefited from the way that beef quotas are structured, the way that corn is imported for feed as opposed to barley, and the way that the JFA imports wheat. Liberalization would lead to a higher market share for Canada in those three instances.

7 Conclusions and Future Choices

The major points discussed in this report are highlighted below, and the implications for the future direction of the grain market – and hence for Prairie agriculture – are given, using this material as background.

Conclusions

Global Market Trends

- Up until the 1950s, Prairie grain exports went mainly to Britain and other European countries. The Canadian grain system was geared to serve the European market, but the market declined.

- Having curtailed its imports, Western Europe is now a major net exporter of grain and one of Canada's competitors.

- World trade in wheat and coarse grains grew at an annual rate of over 7 per cent in the 1970s. This rapid growth ground to a halt in the early 1980s largely because of the global recession.

- The growth in import demand for grains in the 1970s came primarily from developing countries and centrally planned economies. These countries prefer a medium- to low-quality wheat.

- Canada's grain exports gradually shifted to the centrally planned economies – to the point where they now account for about 50 per cent of Canadian exports.

- Market shares among major participants have varied through time. Generally, Canada's market share of wheat exports has been quite stable, ranging between 15 and 25 per cent. The U.S. market share, on the other hand, has ranged from as high as 45 per cent to as low as 25 per cent.

- International grain production increased steadily throughout the 1970s and early 1980s. Large increases came about in the United States, the European Community, India, and China. Canada's production remained relatively stable in the 1970s and did not increase significantly until the 1980s.

- On average, the wheat stock/production ratio was higher in Canada than in the United States during the 1960s and 1970s. That situation has reversed over the last few years.

- International grain prices have always been unstable. For example, the boom period of the late 1920s was followed by the collapse of the 1930s. The 1970s was a prosperous period; however, real wheat prices reached their lowest level in history in 1987. The future will undoubtedly continue to contain boom and bust periods.

Grain Markets and Policy Interdependence

- The Canadian government has always been heavily involved in shaping the direction of Prairie agriculture.

- The grain sector of the Prairies has always been export-oriented, with the bulk of production going into export markets. This was encouraged by the Crow freight rates and reinforced by the *Western Grain Transportation Act*, passed in 1983.

- During most of the 1980s, Canada was able to sell the bulk of its production in spite of the fact that output during that period increased and even though Canada did not sell below the U.S. loan rate except for a brief period in 1985.

- The U.S. government passed the U.S. *Food Security Act* in 1985, which lowered the loan rate and provided for export subsidies. The lowering of the loan rate reduced international wheat prices and resulted in income transfers from the exporters to the importers. The Export Enhancement (subsidy) Program (EEP) reduced prices still further and thus resulted in additional income transfers.

- Canada and the European Community responded to the 1985 U.S. *Food Security Act* by increasing government transfers to farmers. Australia did not respond with cash; instead, it shifted production away from wheat. Canada does not have the production flexibility that Australia has; thus its policy options in the face of a trade war are more limited.

- Policy initiatives around the world are a key factor in determining the future of Canadian agriculture on the Prairies.

Global Agricultural Intervention

- Agricultural protectionism has grown worldwide. The Prairie grain economy has a big stake in the liberalization of trade barriers. There is some optimism, because freer agricultural trade is expected to be given high priority during the Uruguay Round of multilateral GATT negotiations.

- In the rich countries of the world, farmers are paid higher than world prices for their grain, so they expand production beyond market-clearing levels. In the poor countries, they are paid low prices, which reduces production and expands consumption.

- If all subsidies and protectionism were removed, consumers and taxpayers would be better off in the rich countries, and producers would be better off in the poor countries.

- The Japanese and EC farmers enjoy the highest level of protection in the major industrial countries.

- Across countries, dairy, rice, and sugar receive more protection than wheat.

Future Prospects: With and Without Liberalization

- Demand factors will be more important than supply factors in determining future trade patterns; however, grain policies will be the overriding factor.

- The growth rate of the global grain trade in the near future will probably be slower than that of the 1970s but faster than in the early 1980s.

- The import-demand prospects for China and the Soviet Union present an enigma for Prairie agriculture. The Soviet Union has always been an unstable market, and policy reform is on the horizon. China is the largest grain producer in the world, but it has also been one of Canada's largest customers. Whether China can attain self-sufficiency in grains is unknown.

- There will be boom and bust periods in the future, but real grain prices are expected to trend downward in the absence of trade liberalization.

- The global wheat-trade volume may not increase significantly with liberalization, but there would be a reorganization of market shares.

- Grain producers in many industrial countries would lose from total liberalization; consumers and taxpayers would gain in most of them. Global gains could be as high as $100 billion per year for all agricultural products.

- Both the rich and poor countries would be net gainers from liberalization, although there would be some net importing countries within each group that could lose.

Canadian-Japanese Agricultural Trade

- Notwithstanding its importance to Canada as a market for grain exports, Japan has extensive trade barriers in place that eliminate a large amount of trade.

- Japanese consumers pay several times the world price for most food products.

- The Japanese government imports wheat, barley, and beef at the world price and then adds a high margin to that price before reselling them to the Japanese consumer. In 1987 the Japanese government made a profit of about $1.6 billion on wheat imports alone.

- The profits made on food imports are used to fund, in part, Japan's farm subsidies.

- Compared with the United States, Canada stands to gain much more from freer trade with Japan.

Future Choices and Unresolved Issues

The future of Prairie agriculture will depend on strategic Canadian policy choices regarding international markets. This section reviews those options and comments briefly on the crucial policy issues that require resolution.

Current Trade Distortions and the Prospects for Liberalization

Multilateral GATT Approaches

This report documents the fact that the world's grain markets are heavily distorted by government intervention.

Numerous government programs are in place around the world, especially in developed countries – programs that support farm income and protect farmers from international competition. The environment in Canada, as of January 1, 1988, also had a substantial degree of government involvement, including the Crow payments, programs under the *Western Grain Stabilization Act*, and the Special Grains Program. Future policies will evolve from the current situation.

Analysis of total trade liberalization suggests that substantial gains could be made from eliminating trade barriers. It is less clear, however, whether – without any other major changes in the grain export markets – partial trade liberalization would raise world prices sufficiently to offset the benefits that farmers receive from, for example, the Special Grains Program in Canada. To the extent that existing government programs are linked to market prices, freer trade may be of more benefit to Canadian taxpayers than to grain producers.

In the absence of any liberalization, Prairie agriculture will continue to face many uncertainties that originate in the world's export market. Because over 75 per cent of Prairie grain production is exported, it is relatively more costly for Canada to engage in price wars where the major gainers are importers. Therefore, it is even more critical for a country like Canada that export subsidies, production distortions, and price supports be reduced.

The results of many studies show that Canada could compete effectively in the world's grain markets if the principle of comparative advantage was operative in world markets.[1] Canada's costs of production are at least as low as those of many other major trading nations. There are few alternative uses for Prairie farmland; thus the true economic costs of production are low. Under freer trade, Canada's grain production would increase in relation to the current distorted world-trading environment. Canada faces several challenges in this regard, however. Since the growth is likely to be in the demand for the medium-quality, high-yielding varieties, flexibility is needed to enable producers to grow these higher-yielding varieties as part of their crop mix. Since the adoption of high-yielding varieties in Canada is a very recent phenomenon, improvements in that area in the future could well be substantial.[2] This is not to say that there is little or no demand for Canada's high-quality wheats. There will continue to be specific markets, as seen from the discussion on Japan, which will buy only top grades from Canada. In addition, Canada has to continue its efforts to expand markets in other areas, including specialty crops such as lentils and peas. Markets for malt barley, durum wheat, and canola will continue to be important. The future demand for Canadian grain will be more diverse; therefore the emphasis for Canada has to be of much broader scope than in the early development of the Prairie grain economy, when the major emphasis was on the production of high-protein varieties.

In the short run, it is difficult to be overly optimistic about multilateral free trade being achieved, in view of the many barriers outlined above. That is not to say that efforts on this front should not continue. There are those who have studied grain markets and policy for many years who are somewhat pessimistic. The following is a quote from Professor D. Gale Johnson's recent paper on the wheat trade in the 21st century, concerning the possibility of trade liberalization:[3]

> In fact, I believe that of the three broad categorizations of how grain trade will be conducted at the turn of the new century, the most probable is a continuation of the present set of policies and programs by the major grain trading countries. The other two main alternatives – international agreements to significantly affect the level and variability of prices and to influence the location of world grain production or significant liberalization of international trade in grain that would include not only a reduction in levels of protection but also changes in the form of protection – seem to me to be less probable than rather minor tinkering with present programs and policies [p. 26].
>
> While I believe that most of the present policies are not justified by the arguments used to justify them, this does not mean that these policies will be substantially modified in the years ahead. These policies serve the interests of certain groups in each country. The policies and programs do not exist as an accident. Some powerful and influential groups would be adversely affected by substantial modification of them. And, if we think about it a bit, it is probable that these groups include others besides farmers. In fact, for some aspects of the national policies, such as the flour export subsidies used by the European Community and the United States, the beneficiaries are not farmers at all but processors [pp. 26 and 27].

Bilateral Approaches: Long-Term Agreements and Free-Trade Agreements

In response to uncertainty and the shifting market structure, Canada has increasingly sold grain under long-term agreements (LTAs). This has accompanied the increased concentration of wheat exports to centrally planned economies. Whether this has been an optimal strategy in the past or is the appropriate one for the future is not debated here. Three points are worth mentioning, however: 1) Canadian exports in the 1980s did expand to accommodate the increased production without increasing stocks (in fact, Canadian stock levels actually fell); 2) during that period, the Canadian Wheat Board generally did not price below the U.S. loan rate; and 3) by increasing its dependence on the centrally planned economies, the Canadian Wheat Board has run into competition with the EEP, as the United States expanded export subsidies to the CPEs. Thus LTAs do not necessarily prevent price-cutting competition.

If GATT is eventually successful in reducing trade barriers, Canada will benefit in the longer run. In the meantime, the Canada-U.S. Free-Trade Agreement allows for freer trade on a bilateral basis, with potential benefits for Prairie agriculture; it does not, however, address the export subsidies used by the United States in export markets where both countries compete. Thus the gains to Prairie farmers from freer trade between the two countries may be less than the losses resulting from the United States having dropped the loan rate in 1986 and having added the EEP. Therefore the need arises for cooperation, not only in trade between the two countries but also in third-country markets. It is not clear at this point whether the Free-Trade Agreement will contribute to the success of GATT in achieving liberalization in a much broader range of agricultural markets.

Bilateral arrangements could also be pursued between Japan and Canada, since the trade barriers facing Canadian agricultural exports to Japan are significant. Trade could expand in canola oil; the current import tariffs on oil discriminate against the processed product. Possibilities also exist for an expansion of beef, barley, and wheat exports. Bilateral agreements, however, are difficult and expensive to negotiate, and are not a substitute for GATT.

Alternative Strategies Should Trade Liberalization Not Occur

If there are no significant movements towards liberalized trade through bilateral arrangements and/or through GATT, difficult choices remain for Canada regarding the proper strategy for grain production, pricing, and exports. Unless there is significant growth in the demand for grain exports because of population and income growth, an increased demand for meat, and slower foreign production growth, the current situation of excess supplies, low prices, and large government expenditures for export subsidies will likely remain. In this type of environment, the United States could continue to use the EEP to maintain its market share against EC export subsidies. Price cutting results in a transfer of income from the United States, Canada, Australia, and others to grain importers such as the Soviet Union and China. The sure losers in this case are the taxpayers in the exporting countries.

It has been argued in this report that the import demand for U.S. wheat is price-inelastic. Of course, import responsiveness to price varies over time, depending on such factors as stock conditions, and so on. At the time of writing, the U.S. government is aggressively using its EEP, even though Australia and Canada have limited amounts of "old-crop" wheat available to sell. This demonstrates the inflexibility of the Export Enhancement Program.

The EEP has succeeded in reducing U.S. stocks; however, that does not necessarily imply higher prices. The U.S. government recently announced that wheat acreage set-aside requirements for 1988 will be reduced from 27.5 to 10 per cent. This reduction in set-aside acreage translates into an increased wheat supply from the United States in 1988/89. Although this policy move to increase supply is supported by agribusiness concerns (see the *Cargill Bulletin*, April 1988, for example), it does not recognize the importance of an inelastic import demand, and it will not necessarily benefit U.S. farmers.

But recall that the circumstances in the 1980s are not unlike those of the 1930s, late 1950s, the late 1960s, and early 1970s. Each of these periods was preceded by a period of high prices, which fed expectations of a continued boom. That was also the case in the 1970s and early 1980s, and those expectations were incorporated in the 1981 Farm Bill, when loan rates and target prices were raised, clearly based on the belief of ever-rising prices – the belief that Malthus was finally correct.

But the boom years of the 1970s did not persist. When growth slowed in the 1980s, prices collapsed. From this, policymakers should learn that the nature of the demand for grains responds relatively little to price changes (i.e., it is inelastic). Thus excess supplies cause sharp price drops. Export demand is made even more price-inelastic by the internal farm programs in most countries. When demand is inelastic and stocks are excessive, as in 1987, the options facing policymakers are limited.

When similar conditions occurred in the 1930s, a collective strategy of supply reduction was attempted by the major wheat exporters. After the Second World War, unilateral output reduction was tried – by Canada, in 1970, with LIFT and as an intermittent component of U.S. policy, the most expensive of which was PIK in 1983. The difficulty with unilateral output reduction is that exporters who do not reduce output benefit from any price increase – that is known as the "free-rider" problem. The current approach of competitive export subsidies and price cutting in an inelastic market results in revenue losses, even if storage costs are reduced. The current situation can be viewed as a competitive game in which the losers are the taxpayers.[4]

A cooperative solution would take a different form and should be considered seriously, especially if GATT should fail. Details of cooperation strategies have been laid out elsewhere.[5] These imply raising, rather than lowering, prices – as occurred with the 1985 Farm Bill and the EEP. For example, an increase in the loan rate under the 1985 Farm Bill, in conjunction with targeted export subsidies, would have allowed countries such as the United States, Canada, and Australia to charge a high price in markets such as Japan and to reduce prices in more price-responsive markets.

Another part of the strategy could involve the sharing of stock holding and collective supply reduction. Such a degree of exporter cooperation would run counter to the GATT principle of non-discrimination, however, and would have many of the characteristics of a cartel.[6] Since Canada is advocating exporter cooperation, it will clearly have to be prepared to cooperate in good times as well as in bad. Optimal supply management and stock-holding policies will require restraints over all phases of the cycle.

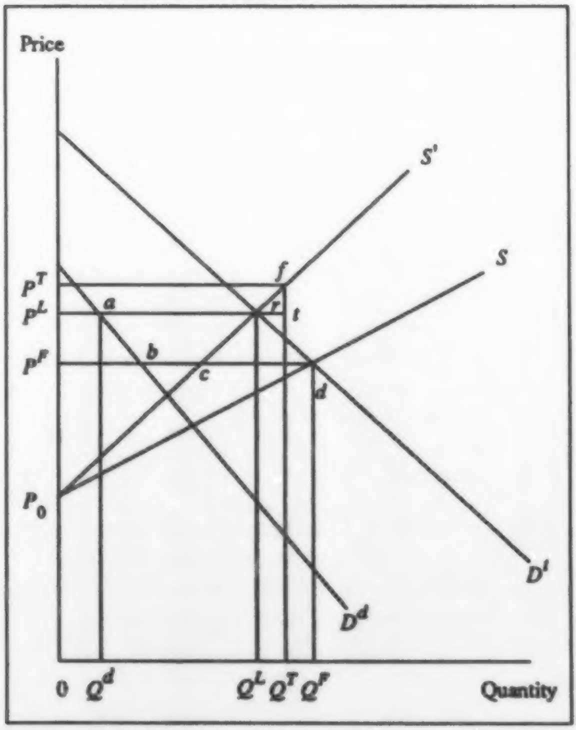
Appendixes

A Canadian Agriculture in the Context of the 1985 U.S. Farm Bill

A theoretical version of the U.S. wheat program adopted in 1985 is represented in Chart A-1.[1] To receive government transfers wheat farmers must leave some acres idle. Over 90 per cent of the wheat acreage was enrolled in 1985. Since there is no production control on program participants, however, farmers allocate additional inputs to their non-idle acres. This shifts the supply curve of U.S. wheat from S to S' in Chart A-1. The total demand facing U.S. farmers, D^t, is comprised of a domestic component, D^d, and an international component, which is presented as the horizontal difference between D^t and D^d. There are two government prices, the guaranteed price to farmers, P^T (target price), and the floor price, P^L (loan rate) supported by government stock purchases. Farmers respond to P^T by producing Q^T.

Chart A-1

Net Cost of 1985 U.S. Farm Bill Programs, Assuming Full Participation and Effective Diversion



SOURCE Babcock, Carter and Schmitz, "The political economy."

Not all of this supply is consumed, however, since at P^L, only Q^L is cumulatively purchased in the domestic and foreign markets. Government stores the excess supply $(Q^T - Q^L)$. The quantity Q^d is consumed domestically; the rest, $Q^L - Q^d$, is exported. With no government program, the equilibrium price and quantity are P^F and Q^F.

Producers benefit by receiving higher prices than the market would otherwise support. They are guaranteed at least the P^T, either through the market or by a combination of government deficiency payments and government stock purchases at P^L. Participants must bear the cost, however, of inefficient wheat production on fewer acres. The change in producer surplus is shown as area P^FcfP^T, less area P_0ca.

Consumers may gain or lose from this policy, depending on whether the loan rate is set above or below the free market price, P^F. Loss of consumer surplus equals area P^FbdP^L.

Government costs are the sum of deficiency payments given by the area $(P^T - P^L)Q^T$ and the storage costs. The cost of taking wheat off the market at price P^L and storing it will depend on future market conditions. The value of government stocks with the large oversupply is taken to be zero as an approximation. This means that our analysis assumes government storage costs to be equal to $P^L(Q^T - Q^L)$. The net domestic cost of this program is thus obtained by adding storage costs to area *rtf* and area P_0ca and then subtracting area *bcrd*.

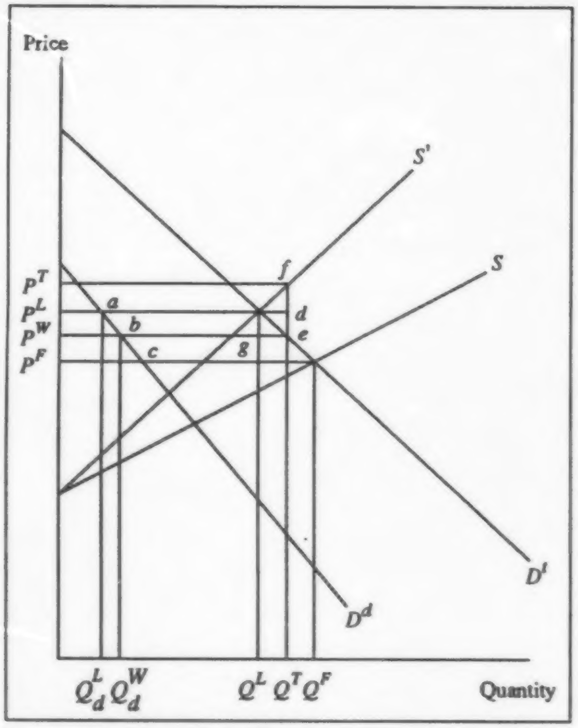
Two interesting qualitative results are apparent. First, the larger the share of exports, the lower the domestic economic cost, since foreign consumers bear more of the cost of higher prices. Second, a less-elastic supply curve results in less inefficient production, lowering the domestic economic cost.

As an extreme alternative to the 1985 Farm Bill, consider Chart A-2, where the loan rate is completely removed. In Chart A-2, S and S' are the same as in Chart A-1. The target price is P^T; and D^t represents the total demand facing U.S.

wheat farmers. In response to P^T, farmers produce quantity Q^T. With the price based on the loan rate, P^L, the government stores $Q^T - Q^L$, as in Chart A-1, and the world price is the U.S. loan rate, P^L.

Chart A-2

Eliminating the Loan Rate while Maintaining Effective Diversion



SOURCE Babcock, Carter and Schmitz, "The political economy."

Removing the loan rate (i.e., the floor price) will have no impact on producer welfare, because producers continue to receive the target price for their wheat. Domestic consumers, however, gain by the lower price and increased consumption levels. As drawn in Chart A-2, with supply Q^T, price drops to P^W to clear the market. Domestic consumption increases from Q_d^L to Q_d^W, with the consumer surplus increasing by area P^LabP^W over what it was with the loan rate in place. The consumer surplus, however, is still less, by area P^WbcP^F, than with the laissez-faire policy because of the assumption of continued, effective-diversion requirements.

With no loan rate and a fixed target price, the purchase costs of government reserves decrease by $P^L(Q^T - Q^L)$, but deficiency payments increase by $Q^T(P^L - P^W)$. Direct government expenditures then change by $(Q^LQ^Tdf - P^LdeP^W)$. This change may be either positive or negative. It is apparent that there exists a trade off between government outlays for reserve purchases and deficiency payments.

If the government's objective is to minimize outlays that are subject to the target price P^T, then the loan rate (P^L) should be set at a level at which a small change in the loan rate will result in equal (in absolute value) changes in deficiency payments and storage costs. That can be seen by minimizing the following:

$$G = SC + D,$$

where G = total government expenditure;
SC = storage costs; and
D = deficiency payments.

Both SC and D are functions of the loan rate; so minimizing G is done by setting the first derivative of G to zero. This results in:

$$\frac{\partial G}{\partial P^L} = \frac{\partial SC}{\partial P^L} + \frac{\partial D}{\partial P^L} = 0.$$

The optimal loan rate is that at which

$$\frac{\partial SC}{\partial P^L} = \frac{\partial D}{\partial P^L}.$$

This shows that if the policy objective is to transfer wealth to farmers, it will not be attained at minimum cost to government by eliminating government storage. Total demand is the sum of domestic and export demand. The elasticity can thus be defined as:

$$\eta^t = k_1\eta^e + (1 - k_1)\eta^d,$$

where k_1 is the export share of total utilization and η^t, η^e, and η^d are total, export, and domestic elasticities respectively. Wheat exports in the years 1981-84 averaged 60 per cent of total utilization, according to the U.S. Department of Agriculture. Given the relatively stable and inelastic domestic demand for U.S. wheat, it seems clear that it is the export-demand elasticity facing U.S. wheat farmers that will determine how Treasury costs will change with the new wheat program.

The elasticity of the excess-demand curve facing U.S. wheat farmers is a function of their export market share, the elasticity of the excess supply of other exporters, and the world-demand elasticity of wheat exports. This relationship can be expressed algebraically as:

$$\eta_d = \frac{1}{k_2}\eta_D + \frac{1-k_2}{k_2}\eta_s,$$

where η_d is the absolute value of the elasticity of the excess-demand curve; k_2 is the U.S. share of the world's export market; η_D is the absolute value of the elasticity of world export demand; and η_s is the elasticity of the export supply of other exporters. From the above relationship it is clear that as long as $k < 1$, $\eta_d > \eta_D$. Table A-1 provides some likely values for the elasticity of the excess-demand curve facing U.S. wheat, given a range of values for the determining parameters.

The ability of the 1985 Farm Bill's wheat program to achieve its goal of lowering government expenditures, maintaining farmer income, and gaining a larger U.S. share of the world's export markets depends critically on the elasticity of demand for U.S. exports. If the demand is very elastic, these goals are likely to be met; if the demand is very inelastic, however, government expenditures could increase dramatically. In addition, as the price-reduction effect on Canada becomes apparent, the greater the inelasticity of demand, the greater the price drop for Canada because of the drop in the loan rate. What is the export-demand elasticity? It is apparent from Table A-1 that both the total demand for exported wheat and the total export supply must be very inelastic to make the export demand facing the United States, with its current market share, become inelastic. As the U.S. export supply and demand are more elastic than the corresponding domestic elasticities of other exporting and importing countries, it is reasonable to conclude that in a world of free trade, the conditions necessary for U.S. wheat farmers to face an inelastic export-demand curve are difficult, indeed, to meet. Trade restrictions tend to make both the world demand for, and supply of, wheat more inelastic, which in turn makes the corresponding export-demand function facing the United States more inelastic. For example, the support price paid to EC farmers makes the EC excess-supply curve perfectly inelastic.

After the provisions of the 1985 Farm Bill took effect, U.S. wheat exports increased, as prices fell because of lower loan rates and the use of the EEP. The value of exports, at least at first, decreased, however, suggesting that the export demand over this period is inelastic. From fiscal year 1986 to fiscal year 1987, the U.S. Department of Agriculture projected that export value would decrease by 6 per cent, while export quantity would increase by 14 per cent. Using the formula for the arc elasticity of demand, this implies that the export-demand elasticity over that period was –0.7.

As an alternative to the 1985 Farm Bill, it can be shown that zero costs to Treasury could be achieved if a policy of raising the loan rate and supporting it with mandatory acreage controls were adopted. Referring to the model in Chart A-3, the international market and the U.S. domestic wheat market are depicted on the right and left, respectively. In the international market, D is the international demand for imported wheat; S_{0e} is the rival exporters' export-supply function; and ES_{us} is the U.S. export-supply function, obtained by horizontally subtracting U.S. demand (D^d) from U.S. supply (S), both of which are depicted on the left graph of Chart A-3. The United States is confronted with an excess export-demand curve d, obtained by horizontally subtracting S_{0e} from D. In the free-trade case, the world price is represented by P^W, with U.S. exports equal to Q_{us}; other exporters' supply equal to $Q_t - Q_{us}$; and U.S. domestic consumption equal to Q^W_d.

If the U.S. floor price is above the free-trade price P^W, then the world price equals P^L; U.S. exports fall to Q'_{us}; other countries increase their share of world exports by exporting $Q'_t - Q'_{us}$; and U.S. domestic consumption declines to Q^L_d. At P^L there exists an excess supply of U.S. wheat. That is clearly shown with reference to D^t, the total demand facing U.S. wheat producers – obtained by horizontally summing U.S. domestic demand and foreign demand d. At the loan rate P^L, U.S. producers supply Q^L_s; but quantity demanded is only Q^L_c. To support that price, quantity $Q^L_s - Q^L_c$ must be taken off the market and stored.

Consider producer welfare under the two situations. Under a support program, producer surplus is higher, by area $P^L hgP^W$, than under a laissez-faire policy, provided that government stores $Q^L_s - Q^L_c$. Clearly, U.S. producers lose from a laissez-faire policy. Alternatively, U.S. producers could still gain rents higher than those under a laissez-faire policy without Treasury exposure. For example, a mandatory reduction of output to Q^L_c would increase rents by $P^L edP^W - dgf$. In the extreme, farmer welfare would be maximized by restricting output to the level at which the supply curve of the United States intersects the marginal-revenue curve corresponding to the total-demand curve facing the United States. Conceptually, this policy approach is similar to the adoption of quotas on sugar; steel; and, until recently, automobiles. These quotas have protected U.S. producers, with no Treasury exposure.

Table A-1

Excess-Demand Elasticities for U.S. Exports, Given the Supply and Demand Elasticities of World Exports[1]

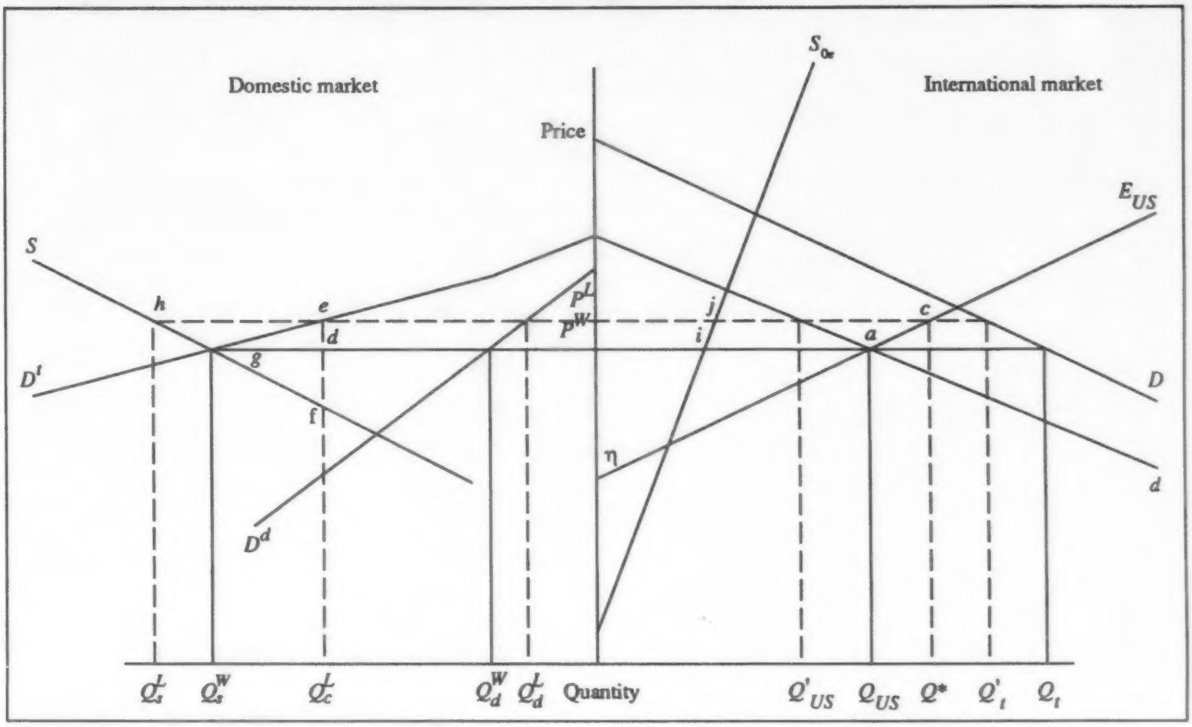
	Supply or demand elasticity											
	(Per cent)											
Excess-supply elasticity of other exporters	0.1				0.4				1.0			
World's wheat-demand elasticity	–0.1	–0.5	–1.0	–3.0	–0.1	–0.5	–1.0	–3.0	–0.1	–0.5	–1.0	–3.0
Excess-demand elasticity facing the United States	–0.45	–1.56	–2.95	–8.5	–0.98	–2.1	–3.48	–9.04	–2.05	–3.16	–4.55	–10.1

[1] The U.S. share of world exports is set at 36 per cent, equal to that in marketing year 1984/85.

SOURCE Calculations by the authors of this study.

Chart A-3

Effects of U.S. Mandatory Production Controls on International and U.S. Domestic Markets



SOURCE Babcock, Carter and Schmitz, "The political economy."

The other exporting countries, such as Canada, obviously enjoy free-rider status when the United States plays a price leadership role. With a world price equal to the U.S. loan rate P^L in Chart A-3, other exporters have a surplus that is greater by P^LjiP^W if the United States acted as a price taker and prices fell to P^W. This rent increase accompanies an expansion in production in competing countries. The magnitude of this accompanying supply increase is an empirical question.

If the export-demand elasticity is very low, then the above policy, which costs the government nothing but generates the same level of producer rent as does the current program, is the mandatory production quota. Table A-2 shows that if the export-demand elasticity is 0.98 or less in absolute value, a quota can generate the same level of producer surplus and have a negative domestic economic cost. This negative cost is due to the ability of U.S. farmers to tax foreign consumers. At elasticities greater than that, the quota program cannot achieve the same level of producer surplus as the 1985 Farm Bill.

The implications of the strategy pursued with the 1985 Farm Bill are clear for Canada. As the above shows, the effect is to lower prices. The alternative policies would have raised prices. Canada responded to the lower prices by introducing deficiency payments ($1 billion in 1987, for example). As a result, this subsidy appears in the PSE calculations. From a policy perspective, however, it has to be kept in mind that the Canadian government transfer was in response to another country's policy action.

Table A-2

Net Domestic Economic Cost of Mandatory Production Quotas ($ 1985)

	Results of production quotas based on different elasticities					
			(Per cent)			
Elasticity of export demand	–0.45	–0.98	–2.1	–3.2	–4.5	–10.1
Quota to maximize producer surplus:						
			(Millions of bushels)			
Quota level	1,231	1,328	1,507	1,650	1,804	2,186
			(Dollars per bushel)			
Market price	7.56	5.34	4.16	3.80	3.60	3.39
			(Millions of dollars)			
Change in producer surplus	5,276	2,715	1,273	796	498	142
Change in consumer surplus	–3,628	–1,954	–922	–577	–360	–105
Net domestic economic cost	–1,648	–761	–351	–219	–138	–37
			(Millions of bushels)			
Exports	633	617	737	862	1,006	1,378
Quota to match producer surplus of current program:						
	(Millions of bushels)					
Quota level	2,043	1,662	Not possible			
	(Dollars per bushel)					
Market price	4.32	4.69				
	(Millions of dollars)					
Change in producer surplus	2,683	2,577				
Change in consumer surplus	–1,164	–1,432				
Net domestic economic cost	–1,519	–1,145				
	(Millions of bushels)					
Exports	1,246	883				

SOURCE B. Babcock, C. Carter, and A. Schmitz, "The political economy of U.S. wheat legislation," a working paper, University of California, Davis, December 1987.

B Effects of the Export Enhancement Program (EEP)

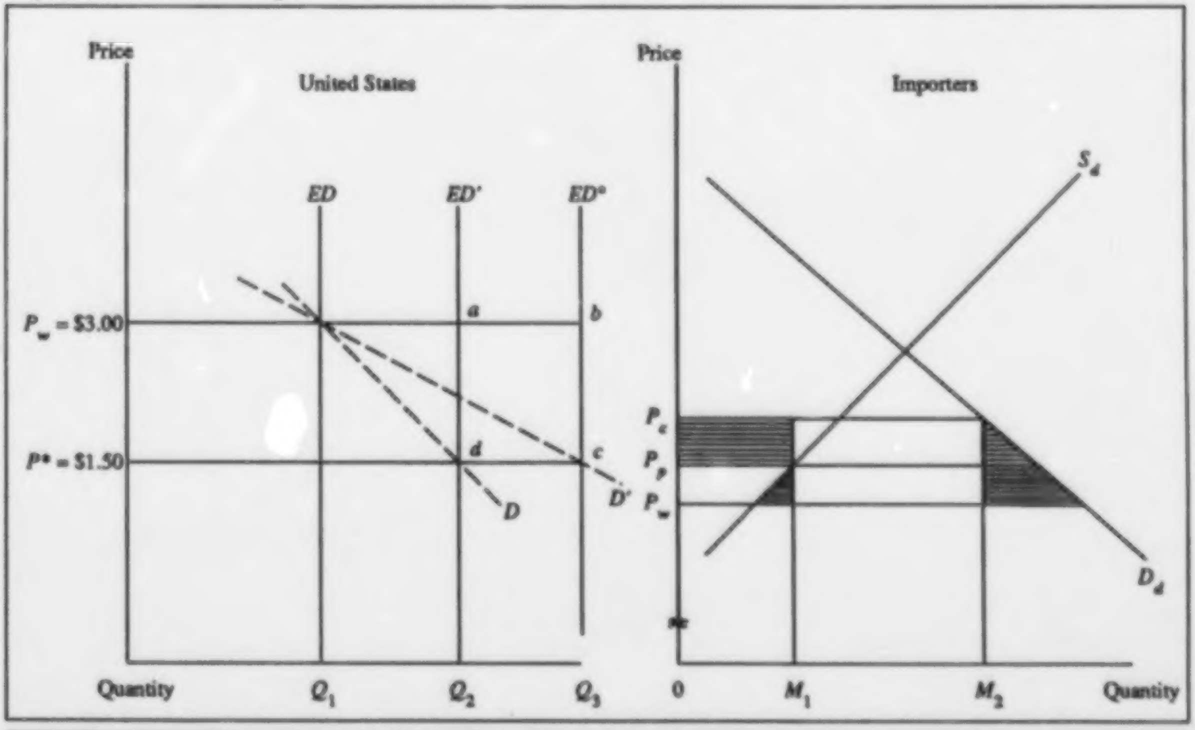
Consider Chart B-1, where importers are aggregated: the aggregate importers' domestic supply of wheat is S_d and domestic demand is D_d. No importer market power is assumed, and because of internal domestic policy, three levels of prices exist: P_c = consumer price; P_p = producer price, and P_w = world price or import price. The quantity imported is M_1M_2. The net cost of their internal price policies to importers is represented by the sum of the three cross-hatched areas.

On the left-hand side of the diagram, the excess-demand curve confronting the United States is *ED*, where P_w = $3.00/bushel and Q_1 is exported. This amount equals M_1M_2. It is assumed that the amount supplied from the United States is made available from excess stocks. At a price of $3.00/bushel, the total value of sales equals $3.00 x Q_1.

Suppose there is a complete crop failure in the aggregate importing region but that consumption remains at M_2, at price P_c. This results in a shift in the U.S. excess-demand curve to *ED'*, where imports $0M_2$ equal exports Q_2. Note that for the United States to sell Q_2 it does not need to lower prices from $3.00/bushel to $1.50/bushel through EEP. The import demand is insensitive to price. By lowering the price

Chart B-1

Export Enhancement Program



to \$1.50/bushel, the United States loses revenue by the amount equal to \$1.50 x Q_2. That is a transfer from the U.S. Treasury to importers.

To highlight the conclusions further, suppose the excess demand shifted to *ED°* from *ED*. At a price of \$1.50/bushel, the United States loses an additional amount equal to *abcd*. Note that the demand curve estimated by plotting price/quantity points is more elastic than the true excess-demand curve. As the excess-demand curve shifts further to the right because of factors such as weather, the more elastic the demand curve appears to become – e.g., *D* for the shift to *ED'* and *D'* for the shift to *ED°*. Note two aspects of the model. As the perceived excess-demand curve becomes more elastic (which is the case for large production shortfalls), the greater becomes the cost to the U.S. Government in terms of export-subsidy transfers to importers. Second, for there to be an increase in total revenue from export sales because of a price drop, a 50-per-cent drop in price would have to be accompanied by more than a 100-per-cent increase in the quantity sold.

This model is presented since it shows that an increase in the quantity of U.S. exports is correlated with a drop in the export price, but the drop in price did not cause the increase in quantity exported; it was the result of crop shortfalls. In this case, the United States did not have to lower the price to expand exports. By so doing, there was a cost incurred by the U.S. Treasury. The above is important, since during the period around 1987 when U.S. exports in volume terms expanded, crop shortfalls around the world also occurred – e.g., the poor wheat crop in India and a poor rice crop in parts of Asia.

The excess-demand curve that one would estimate by regressing only exports against price gives biased results because the model is misspecified. In that case, exports are a function of price and weather variables. This discussion has empirical significance in view of the use by the United States of EEP to increase the value of grain exports. The quantity of U.S. exports increased significantly during 1987. In this regard, export volume is negatively correlated with price; under EEP, prices were lowered. The question remains, however, as to whether the price drop caused exports to rise or whether the expansion in exports was due to crop shortfalls around the world – e.g., the poor wheat crop in India – or to a combination of the two? There is little empirical evidence available to help answer that question.

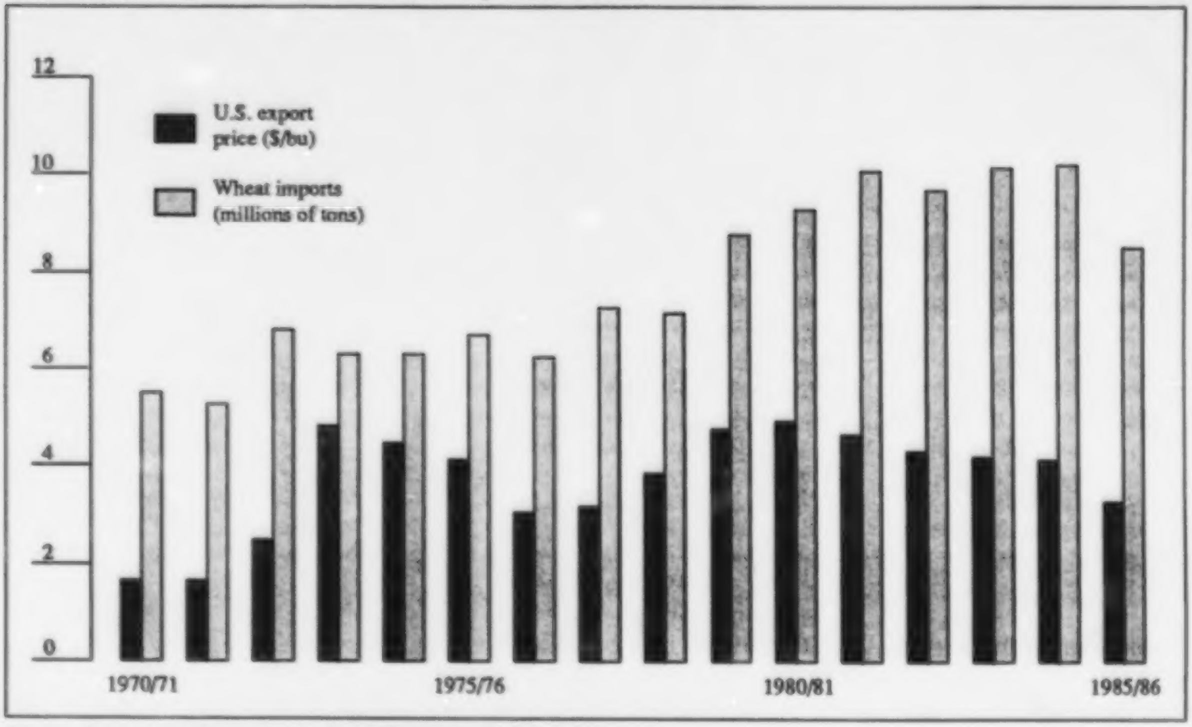
Theoretically, as shown above, when internal policies set producer and consumer prices independently of world prices, the more inelastic the export-demand curve facing the United States becomes. In many grain-importing countries, internal prices are set below or above world prices and are inflated – e.g., Japan.

Because policy design hinges on knowledge of the effect, one cannot overemphasize avoiding the misspecification problem illustrated above. Another example for grains is shown in Chart B-2. Global wheat imports are shown along with wheat prices. The data show that prices and exports are positively correlated. If the demand equation estimated was the true demand curve, then to increase exports one would raise the price rather than lower it. In essence, the demand curve would be upward-sloping. Clearly, however, it was not the price that caused exports to rise; instead, crop shortfalls, monetary phenomena, income growth, and other factors caused exports to expand in the 1970s, which in turn caused prices to rise.

Table B-1 reports monthly volume and value figures for U.S. grain exports for the 1983-87 period. Data are provided for wheat, feed-grain, and total grain exports. Wheat exports declined from 41.98 mmt in 1984 to 23.87 mmt in 1985. Correspondingly, the value of wheat exports fell from \$6.4 billion to \$3.6 billion. Revenues dropped further, to \$3.01 billion for 1986, as a result of lowering the loan rate. The EEP expanded the volume of wheat exports from 23.78 mmt in 1986 to 30.63 mmt in 1987; however, the value of those exports increased only marginally, from \$3.01 billion to \$3.04 billion.

Chart B-2

Global Wheat Imports and Wheat Prices, Crop Years 1970/71 to 1985/86



SOURCE International Wheat Council, *World Wheat Statistics*, various years.

Table B-1

Monthly Data on U.S. Grain Exports, by Volume and Revenue, 1983-87

	Wheat		Feed grain		All grains	
	Volume	Revenue	Volume	Revenue	Volume	Revenue
	(Thousands of metric tons)	(Millions of dollars)	(Thousands of metric tons)	(Millions of dollars)	(Thousands of metric tons)	(Millions of dollars)
1983:						
January	3,414	555	7,952	584	11,250	1,305
February	4,166	592	4,573	525	10,121	1,291
March	3,699	605	4,875	587	9,861	1,408
April	3,280	543	4,125	517	9,108	1,159
May	2,272	448	4,035	533	7,800	1,087
June	3,282	521	4,103	555	8,291	1,199
July	3,364	509	3,580	497	8,500	1,102
August	2,954	412	3,639	510	8,000	1,046
September	3,423	544	4,566	660	9,856	4,666
October	5,462	523	5,658	688	11,979	4,609
November	2,870	468	5,683	836	9,012	1,389
December	3,532	577	5,279	772	9,801	1,639
Average	3,477	525	4,839	605	9,465	1,825
Annual total	41,718	6,297	58,068	7,264	113,579	21,900
1984:						
January	2,897	444	6,144	761	9,849	1,369
February	3,024	482	4,771	701	8,610	1,361
March	3,231	504	5,361	786	9,841	1,582
April	2,644	405	4,919	743	8,587	1,397
May	3,070	486	4,588	695	8,597	1,414
June	2,867	439	3,160	474	7,004	1,146
July	3,681	532	3,851	575	8,403	1,326
August	3,979	595	3,996	577	8,840	1,370
September	6,608	1,004	3,772	506	11,170	5,673
October	3,737	561	3,832	396	9,455	1,383
November	2,648	405	6,938	876	10,508	1,464
December	3,591	550	6,132	767	10,518	1,502
Average	3,498	534	4,789	655	9,282	1,749
Annual total	41,977	6,407	57,464	7,857	111,382	20,987
1985:						
January	1,961	444	3,037	761	5,718	1,369
February	2,327	356	5,117	654	8,299	1,175
March	1,576	240	5,218	544	7,843	1,103
April	1,846	284	4,882	614	7,745	1,111
May	1,540	240	3,989	501	6,382	929
June	2,293	335	3,347	417	6,478	927
July	1,740	247	2,978	355	5,477	770
August	2,364	331	2,829	324	6,068	835
September	1,965	265	2,776	291	5,673	746
October	2,331	310	5,026	645	7,130	901
November	2,242	311	5,871	619	9,048	1,102
December	1,683	238	4,762	507	7,361	930
Average	1,989	300	4,153	519	6,935	992
Annual total	23,868	3,601	49,832	6,232	83,222	11,898

Table B-1 (concl.)

	Wheat		Feed grain		All grains	
	Volume	Revenue	Volume	Revenue	Volume	Revenue
	(Thousands of metric tons)	(Millions of dollars)	(Thousands of metric tons)	(Millions of dollars)	(Thousands of metric tons)	(Millions of dollars)
1986:						
January	1,126	267	2,021	513	3,925	980
February	1,929	263	3,381	380	6,254	825
March	1,832	255	2,644	293	5,559	761
April	1,536	211	1,691	183	4,232	595
May	1,263	177	1,480	159	3,697	516
June	2,164	275	1,678	184	4,877	652
July	2,843	323	1,609	160	5,655	711
August	3,121	338	1,790	156	6,374	743
September	2,669	295	2,675	212	6,756	753
October	2,299	264	3,990	314	7,440	783
November	1,614	185	3,600	271	6,360	651
December	1,389	157	3,625	288	6,287	662
Average	1,982	251	2,515	259	5,618	719
Annual total	23,785	3,010	30,184	3,113	67,416	8,632
1987:						
January	1,760	181	3,066	241	6,061	631
February	1,844	190	3,396	261	6,548	651
March	1,783	182	4,685	359	7,774	752
April	1,781	183	5,368	405	8,306	778
May	1,758	184	4,898	362	8,011	780
June	3,260	313	3,402	281	7,720	762
July	4,318	397	4,162	343	9,817	971
August	3,069	293	3,227	264	7,361	742
September	3,264	339	4,127	323	8,635	866
October	2,767	281	4,280	339	8,388	845
November	1,937	188	3,770	311	6,935	712
December	3,086	311	4,665	395	9,065	934
Average	2,031	206	4,136	318	7,403	726
Annual total	30,627	3,042	49,046	3,884	94,621	9,424

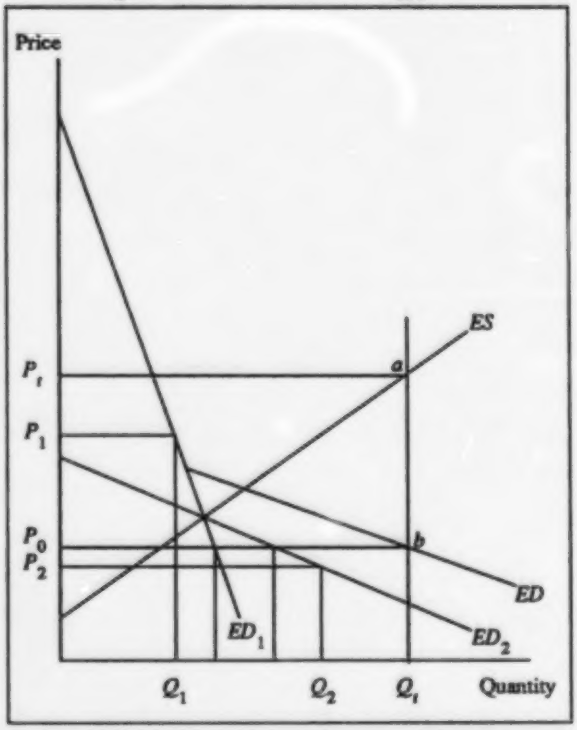
SOURCE U.S. Department of Agriculture, *Agricultural Outlook*, 1983-1987, various issues.

C Minimizing the Cost of Export Subsidies

As discussed earlier, countries such as the United States target export subsidies in the sense that the price paid by Japan, for example, is higher than that paid by the Soviet Union. The notion of charging different prices can lead to positive benefits, as shown in Chart C-1.[1] The U.S. excess-supply curve is *ES;* the excess-demand curve for country 1 is ED_1 and for country 2, ED_2. The total-excess-demand curve is *ED*.

Chart C-1

Minimizing the Cost of Subsidies to Egypt



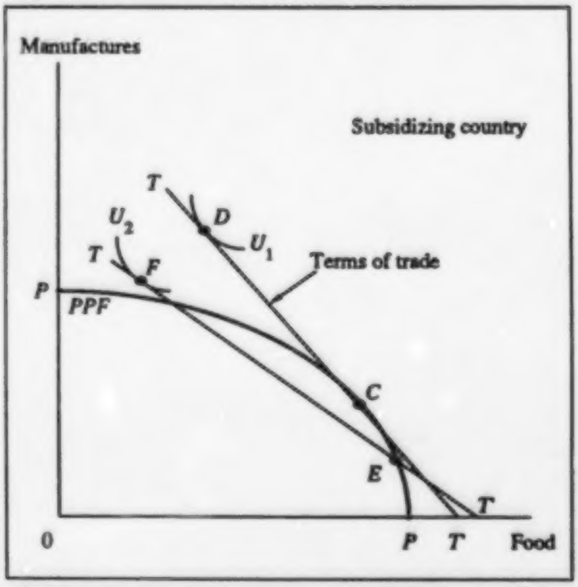
The support price for producers is set at P_t, which corresponds to output Q_t. The market price is P_0. As a result, the government cost of the program is P_tabP_0. Note that the price P_0 is charged to both importers. By charging different prices, however, the cost of using support prices for producers could be reduced. For example, if country 1 were charged P_1 and country 2 were charged P_2, the government cost would be reduced to below P_tabP_0. The greater the differences in the price elasticities of the excess-demand curves, the larger the savings to government from charging varying rather than uniform prices among markets.

In the above model, export subsidies, regardless of their nature, result in net welfare costs to the United States. The cost arises essentially because producer prices in the United States are set above market clearing prices. The use of targeted export subsidies rather than a general export subsidy merely reduces the cost of farm-price support; it does not eliminate the cost.

A general equilibrium presentation of an export subsidy is made in Chart C-2. In competitive equilibrium, the country in question produces at point *C*, where the

Chart C-2

Export Subsidies and Effects on Terms of Trade



international-price line *TT* is tangent to the production-possibility curve *PP*. Consumption will take place at point *D*, with an associated utility level of U_1. An export subsidy will necessarily move the production point downwards from point *C* to point *E* and will lower the terms of trade from *TT* to *T'T'*. The subsidizing country is now consuming at point *F*, which is at a lower level of utility U_2. Thus an export subsidy is never optimal in a two-country, two-good, competitive world.

The result in Chart C-2 also holds for an income transfer; that is, in a two-country, two-good world, country 1 cannot improve its welfare position by transferring income to country 2. In a three-country model, however, that result could be overturned, and it is possible that country 1 could improve its welfare through an income transfer; see Bhagwati et al.[2]

An export subsidy, like that under the EEP, is a per-unit payment on exported volumes; it is therefore welfare-reducing for both the United States and the other exporters. The importers and the grain companies, however, are the large gainers.

D The Impact of Liberalization on Japan and China

To emphasize that the effects of trade liberalization may not be the same for any two importing regions, we illustrate that point by comparing two quite different importers: Japan and China.

Japan

The wheat-pricing policy in Japan fixes farm prices at extremely high levels. The 1986 price was $29.25 per bushel. Japanese farmers produce about 14 per cent of their domestic wheat requirements. The Japanese Food Agency buys wheat from farmers and resells it to domestic mills at a lower price; the resale price is still well above world price levels, however. This market is depicted in Chart D-1. The Japanese farm-gate price is depicted as P_p, the Japanese consumer price, as P_c; and the world price as W_p. The quantity produced domestically is shown as $0Q_1$, with imports equaling $0Q_2 - 0Q_1$. Trade liberalization in this market would lead to an elimination of P_p and P_c. It is likely that Japan would not grow any wheat at the world price, W_p. Imports would increase, to equal $0Q_3$. There would be significant consumer gains associated with the lower price and higher level of imports. The increase in consumer surplus would equal the area P_cW_pdc. Taxpayers would save an amount equal to P_paeP_c. Japanese farmers would lose from liberalization – by an amount equal to area P_pab. Therefore, the distributional impact of liberalizing the wheat market in Japan means large consumer gains, relatively small taxpayer gains, and relatively small producer losses.

China[1]

In China, wheat prices to urban consumers are kept low – and well below producer prices. The wheat sold by farmers

Chart D-1

The Impact of Liberalization on the Wheat Market of Japan

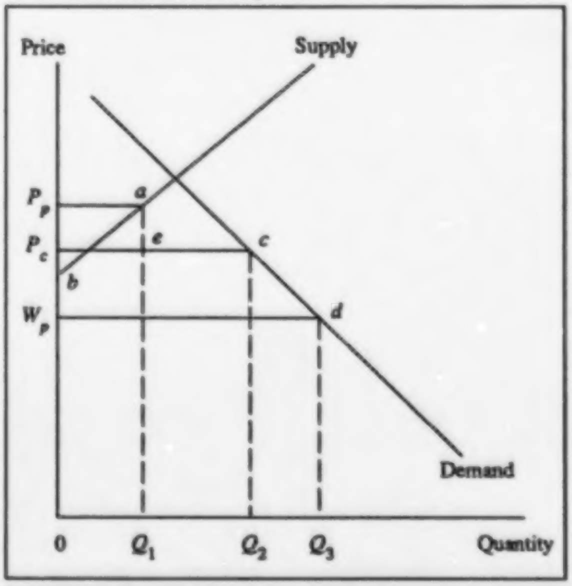
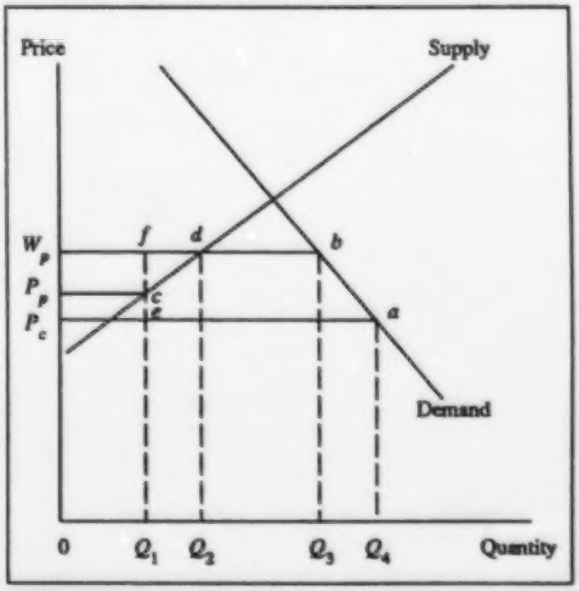


Chart D-2

The Impact of Liberalization on the Wheat Market of China



to the government fetches a price that is below the world level. This market situation is depicted in Chart D-2. As already mentioned in the previous chapter, the producer price (for government purchases) is P_p; the consumer price (for government resales) is P_c; and the world price is W_p. Production is equal to $0Q_1$, with consumption at $0Q_4$. Imports are represented by the distance $0Q_4 - 0Q_1$. Trade liberalization would eliminate P_p and P_c, both of which would rise to W_p. As a consequence of liberalization, consumers would lose an amount equal to area W_pP_cab; producers would gain area W_pP_pcd; and the government would save an amount equal to area $P_pP_cec + fbae$. The savings come about with the removal of the consumer subsidy. The level of wheat imports in China would fall to an amount equal to $0Q_3 - 0Q_2$.

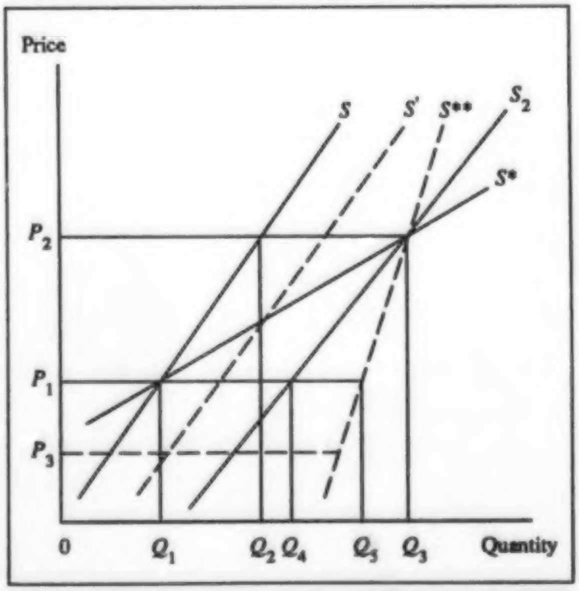
The distributional impact would amount to a relatively large consumer loss, a large government gain, and relatively small producer gains.

E The Nonsymmetrical Effect of Protection and of Its Removal

To see the nonsymmetrical effect of protection and of its removal, consider Chart E-1. Consider the European Community. The supply curve prior to the formation of the European Community is S, and the price is P_1, with an output of Q_1. With the price supports brought about by the Common Agricultural Policy at P_2, short-run response generates output Q_2. With learning by doing and technological change, however, supply shifts to S' and then to S_2, where now with price at P_2 output is Q_3. The long-run supply curve becomes S^*. If prices are lowered to P_1 because of trade liberalization, however, output does not go back to Q_1; instead, output contracts along S_2 to Q_4. The supply response to higher prices is greater than that to lower prices. This implies that for exporting countries such as Canada, part of the damage is already done even if a world of liberalized trade should be achieved. Many of the trade models surveyed above do not account for this irreversibility of supply.

Chart E-1

Effects of Protection and of Its Removal



There is an additional issue: not only has the supply curve shifted, but what about its slope? What happens if supply is S^{**} rather than S^*? In that case, output would fall much less if the price were reduced to P_1 than if the supply was S^*. Also, because the output reduction is less from lower prices, the effect of trade liberalization would be to lower prices more to exporters if S^{**} existed rather than S^*. Instead of prices falling to P_1 from P_2 because of trade liberalization, prices could fall to P_3.

Estimates of the gains from freer trade clearly rest on the nature of the supply response to price change. Studies differ concerning estimates of response. Some contend that for the European Community, the supply curve could very well be quite inelastic, which implies that export prices would not rise nearly as much under free trade as they would if the opposite were true.[1]

Table E-1 provides a sample of supply elasticities that have been estimated for EC wheat. They range from 0.30 to

Table E-1

Estimates of Supply Elasticity for Wheat in the European Community

	Yield	Area	Supply
Model:			
FAPRI	0.66	--	0.66
Meilke/de Gorter	--	0.34	--
Tyers/Anderson	--	--	0.30
Gardiner	0.11	0.26	0.37

SOURCE Center for Agricultural and Rural Development (CARD), "FAPRI trade model for the wheat sector: Specification, estimation, and validation," Staff Report 86-SR3, Iowa State University, January 1986; K. D. Meilke and H. de Gorter, "An econometric model of the European Community's wheat sector," Discussion Paper 8511, School of Agricultural Economics, University of Guelph, Canada, 1985; R. Tyers and K. Anderson, "Distortions in world food markets: A quantitative assessment," a background paper for the World Bank's *World Development Report, 1986*; and W. H. Gardiner, "Impact of alcohol fuel production on agricultural markets," Ph.D. thesis, Purdue University, 1986.

0.66 in four recent econometric studies. These elasticities may be interpreted as demonstrating some response in the European Community to lower wheat prices: for a 10-per-cent drop in price, supply may fall anywhere from 3 to 6.6 per cent. As pointed out above, however, supply irreversibility may mean that those elasticities are overestimated. The debate on supply response in the European Community is one that cannot be answered here; instead, we point out that it is a critical issue – albeit a complicated one.

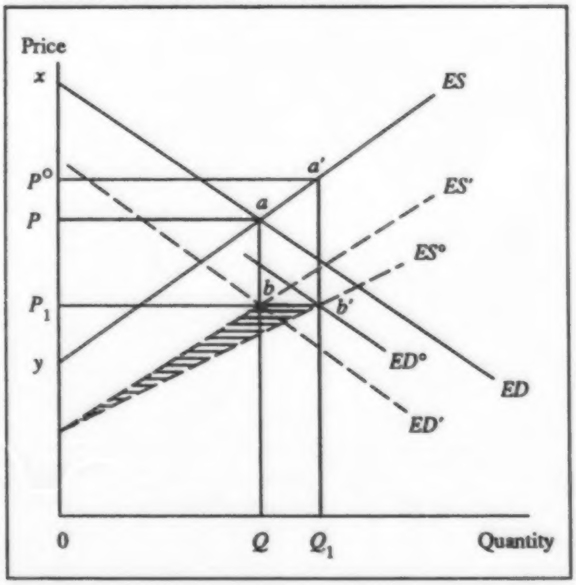
In economic terms, the results in Table E-1 suggest that there are substantial rents to be lost by EC farmers should trade liberalization occur and prices fall. The more price-inelastic the supply, the greater the loss in rents when prices fall.

F Gains from Trade and Effects on Producers

Gains-from-trade theory demonstrates that trade liberalization generates net welfare gains to society, accompanied by distributional effects, such that certain sectors could actually lose from freer trade. This was illustrated for U.S. grain producers by Schmitz, Sigurdson, and Doering.[1] A simplified version follows in Chart F-1. In the free-trade case the excess supply for U.S. grain is *ES*, and the excess demand is *ED*. Exports are *Q*, at price *P*. The gains from trade are *xay*, where *Pay* is the net gain for the United States and *xaP* is the net gain to the importer. The area *Pay* is actually the net gain to grain producers from free trade.

Chart F-1

Producer Effects from Freer Trade



Suppose, now, that because of trade distortions the excess-demand curve shifts inward to *ED'*. Clearly this would be a loss to U.S. producers unless the government responded. If the U.S. government adds an export subsidy to shift *ES* to *ES'*, both the volume of trade and producer welfare are unaffected. Producers are unaffected by tariff barriers because the free-trade rent, *Pay*, is equal to the rent with subsidies; that is, $Pay = P_1bZ$, and the cost to the government is $PabP_1$. Government transfers have offset producer losses from increased protectionism. Thus freer trade has no effect on producers, but there is a gain to the United States as a whole.

Suppose that the excess-demand curve shifted to *ED°* because of protectionism and that the U.S. government responded with a subsidy of $P°a'b'P_1$, shifting the excess-supply curve to *ES°*. Exports increase beyond the free-trade amount to Q_1. Producers are better off than with free trade by the cross-hatched area. In this case, even though the United States as a country gains from free trade, producers actually lose. It is that type of argument that will lead regions such as the European Community and Japan to be skeptical of GATT, especially if producer interests are taken into account, which in all likelihood will be the case. Producer groups in such regions as the European Community and Japan have strong political support.

This analysis shows that it is possible for producers to become worse off with freer trade, where the beneficiaries are taxpayers and consumers. Clearly, producers in the European Community, for example, would be made worse off since the prices to producers are currently supported well above world market prices.

Notes

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CHAPTER 7

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APPENDIX A

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APPENDIX E

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APPENDIX F

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